



# FCC RADIO TEST REPORT

FCC ID : PPQ-WP8333V5  
Equipment : 802.11ac Tri Band PoE Access Point  
Brand Name : LITE-ON, WatchGuard  
Model Name : WP8333V5, C-110, AP325  
Applicant : LITE-ON Technology Corp.  
Bldg. C, 90, Chien 1 Rd., Chung-Ho, New Taipei City, 23585 Taiwan  
Manufacturer (1) : Lite-On Network Communication (Dongguan) Limited  
30#Keji Rd., Yin Hu Industrial Area, Qingxi Town, DongGuan City, Guangdong, China  
Manufacturer (2) : LITE-ON Technology Corp. Networking Plant  
No. 101, Neihuan N. Rd., Nanzi Processing Export, Nanzi Dist., Kaohsiung City 811, Taiwan  
Standard : 47 CFR FCC Part 15.247

The product was received on Nov. 11, 2019, and testing was started from Nov. 11, 2019 and completed on Dec. 26, 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: Cliff Chang

**SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory**  
No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)



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## History of this test report



## 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:**

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: Wendy Pan



## 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	1TX
2.4-2.4835GHz	BT-EDR(3Mbps)	1	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.
- Nss-Min is the minimum number of spatial streams.
- Nant is the number of outputs. e.g., 2(2, 3) means have 2 outputs for port 2 and port 3. 2 means have 2 outputs for port 1 and port 2.



## 1.1.2 Antenna Information

Set	Ant.	Port	Brand	P/N	Antenna Type	Connector	Radio
1	1	1	LYNwave	MLX19X-126AA1-A	PIFA Antenna	I-PEX	R1
	2	2	LYNwave	MLX19X-126AA1-A	PIFA Antenna	I-PEX	R1
	3	1	LYNwave	MLX19X-126AA1-A	PIFA Antenna	I-PEX	R2
	4	2	LYNwave	MLX19X-126AA1-A	PIFA Antenna	I-PEX	R2
	5	1	LYNwave	MLX19X-126AA1-A	PCB Antenna	I-PEX	R4
	6	1	LYNwave	MLX19X-126AA1-A	PCB Antenna	I-PEX	R3
	7	2	LYNwave	MLX19X-126AA1-A	PCB Antenna	I-PEX	R3

Ant.	Gain (dBi)							
	Radio 1		Radio 2		Radio 3			Radio 4
	WLAN 2.4GHz	WLAN 5GHz B1	WLAN 5GHz B4	WLAN 2.4GHz	WLAN 5GHz B1	WLAN 5GHz B4	Buletooth	
	1	6.3	-	-	-	-		-
2	6.5	-	-	-	-	-		-
3	-	5.6	5.9	-	-	-		-
4	-	5.6	4.6	-	-	-		-
5	-	-	-	-	-	-		2.1
6	-	-	-	6.5	4.7	6.0		-
7	-	-	-	6.5	4.8	5.5		-

Note: The above information was declared by manufacturer.

The EUT contain Radio 3 (2.4G)/(5G) RF module (Model Name: WM862FEMD / FCC ID: PQ-WM862FEMD).

**For 2.4GHz function:**

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

**Radio 1**

Ant. 1 and Ant. 2 could transmit/receive simultaneously.

**Radio 3**

Ant. 6 and Ant. 7 could transmit/receive simultaneously.

**For 5GHz function:**

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

**Radio 2 (For Band 1/Band 4)**

Ant. 3 and Ant. 4 could transmit/receive simultaneously.

**Radio 3 (For Band 1/Band 4)**

Ant. 6 and Ant. 7 could transmit/receive simultaneously.

**For Bluetooth function:**

For bluetooth mode (1TX/1RX)

Only Ant. 5 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)	0.49	3.1	2.905m	1k
BT-EDR(2Mbps)	0.489	3.11	2.957m	1k
BT-EDR(3Mbps)	0.469	3.29	2.915m	1k

Note:

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

### 1.1.4 EUT Operational Condition

EUT Power Type	From Power Adapter or PoE
Test Software Version	telnet

### 1.1.5 Table for Multiple Listing

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

Brand Name	Model Name	Description
LITE-ON	WP8333V5	All the models are identical, the difference model for difference brand
WatchGuard	C-110, AP325	served as marketing strategy.

From the above models, model: AP325 was selected as representative model for the test and its data was recorded in this report.

### 1.1.6 Table for Explanation of Flash

Brand name	Model name	Flash
winbond	25Q256JVFQ	32M+32M



## 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
- ♦ 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	23.2~24.4°C / 60~62%	Nov. 26, 2019 ~ Dec. 13, 2019
Radiated < 1GHz	03CH05-CB	Eason Chen	23.7~24°C / 60~62%	Nov. 25, 2019 ~ Nov. 26, 2019
Radiated > 1GHz	03CH06-CB	Stim Sung	25.3~25.9°C / 55~58%	Nov. 11, 2019 ~ Dec. 26, 2019
AC Conduction	CO02-CB	Rick Yeh	20~21°C / 49~50%	Dec. 03, 2019 ~ Dec. 04, 2019

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	PowerSetting
BT-BR(1Mbps)	-
2402MHz	0x08
2440MHz	0x07
2480MHz	0x04
BT-EDR(2Mbps)	-
2402MHz	0x08
2440MHz	0x08
2480MHz	0x08
BT-EDR(3Mbps)	-
2402MHz	0x08
2440MHz	0x08
2480MHz	0x07



## 2.2 The Worst Case Measurement Configuration

The Worst Case Mode for Following Conformance Tests	
<b>Tests Item</b>	AC power-line conducted emissions
<b>Condition</b>	AC power-line conducted measurement for line and neutral
<b>Operating Mode</b>	Normal Link
1	EUT - R1 (2.4G) + R2 (5G) + R3 (2.4G) + R4 (BT) + Adapter
2	EUT - R1 (2.4G) + R2 (5G) + R3 (5G) + R4 (BT) + Adapter

For operating mode 1 is the worst case and it was record in this test report.

The Worst Case Mode for Following Conformance Tests	
<b>Tests Item</b>	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
<b>Test Condition</b>	Conducted measurement at transmit chains



The Worst Case Mode for Following Conformance Tests	
<b>Tests Item</b>	Emissions in Restricted Frequency Bands
<b>Test Condition</b>	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.
<b>Operating Mode &lt; 1GHz</b>	Normal Link
1	EUT in Z axis - R1 (2.4G) + R2 (5G) + R3 (2.4G) + R4 (BT) + Adapter
2	EUT in Y axis - R1 (2.4G) + R2 (5G) + R3 (2.4G) + R4 (BT) + Adapter
Mode 2 has been evaluated to be the worst case among Mode 1~2, thus measurement for Mode 3 will follow this same test mode.	
3	EUT in Y axis - R1 (2.4G) + R2 (5G) + R3 (5G) + R4 (BT) + Adapter
Mode 2 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 in Y axis - R1 (2.4G) + R2 (5G) + R3 (2.4G) + R4 (BT) + PoE
For operating mode 4 is the worst case and it was record in this test report.	
<b>Operating Mode &gt; 1GHz</b>	CTX
<b>For Radiated Emission</b> The EUT was performed at X axis, Y axis and Z axis and the worst case was found at Z axis. So the measurement will follow this same test configuration.	
<b>For Band Edge Emission</b> The EUT was performed at X axis, Y axis and Z axis position and the worst case was found at X axis. So the measurement will follow this same test configuration.	

The Worst Case Mode for Following Conformance Tests	
<b>Tests Item</b>	Simultaneous Transmission Analysis - Co-location RF Exposure Evaluation
<b>Operating Mode</b>	
1	WLAN 2.4GHz (Radio 1) + WLAN 5GHz (Radio 2) + WLAN 2.4GHz (Radio 3) + Bluetooth (Radio 4)
2	WLAN 2.4GHz (Radio 1) + WLAN 5GHz (Radio 2) + WLAN 5GHz (Radio 3) + Bluetooth (Radio 4)

Refer to Sporton Test Report No.: FA741722-10 for Co-location RF Exposure Evaluation.

Note: The PoE and Adapter were for measurement only, would not be marketed.

The PoE and Adapter information as below:

Support Unit	Brand	Model Number
PoE	Ruckus	740-64214-001
Adapter	APD	WB-18D12FU



## 2.3 EUT Operation during Test

For CTX Mode:

The EUT was programmed to be in continuously transmitting mode.

For Normal Link:

During the test, the EUT operation to normal function.

## 2.4 Accessories

N/A

## 2.5 Support Equipment

For AC Conduction:

Support Equipment				
No.	Equipment	Brand Name	Model Name	FCC ID
A	Flash disk3.0	Transcend	639205 7755	N/A
B	Notebook	DELL	E6430	N/A
C	Notebook	DELL	E6430	N/A
D	Notebook	DELL	E6430	N/A
E	Notebook	DELL	E6430	N/A
F	BT Device	WatchGuard	C-110	PPQ-WP8333V5
G	Notebook	DELL	E6430	N/A
H	LAN2 NB	DELL	E6430	N/A
I	Adapter	APD	WA-24Q12FU	N/A

For Radiated (below 1GHz):

Support Equipment				
No.	Equipment	Brand Name	Model Name	FCC ID
A	Notebook	DELL	E4300	N/A
B	Notebook	DELL	E4300	N/A
C	Notebook	DELL	E4300	N/A
D	Notebook	DELL	E4300	N/A
E	Notebook	DELL	E4300	N/A
F	BT Device	WatchGuard	C-110	PPQ-WP8333V5
G	Flash disk3.0	Silicon Power	B06	N/A
H	PoE	Ruckus	740-64214-001	N/A

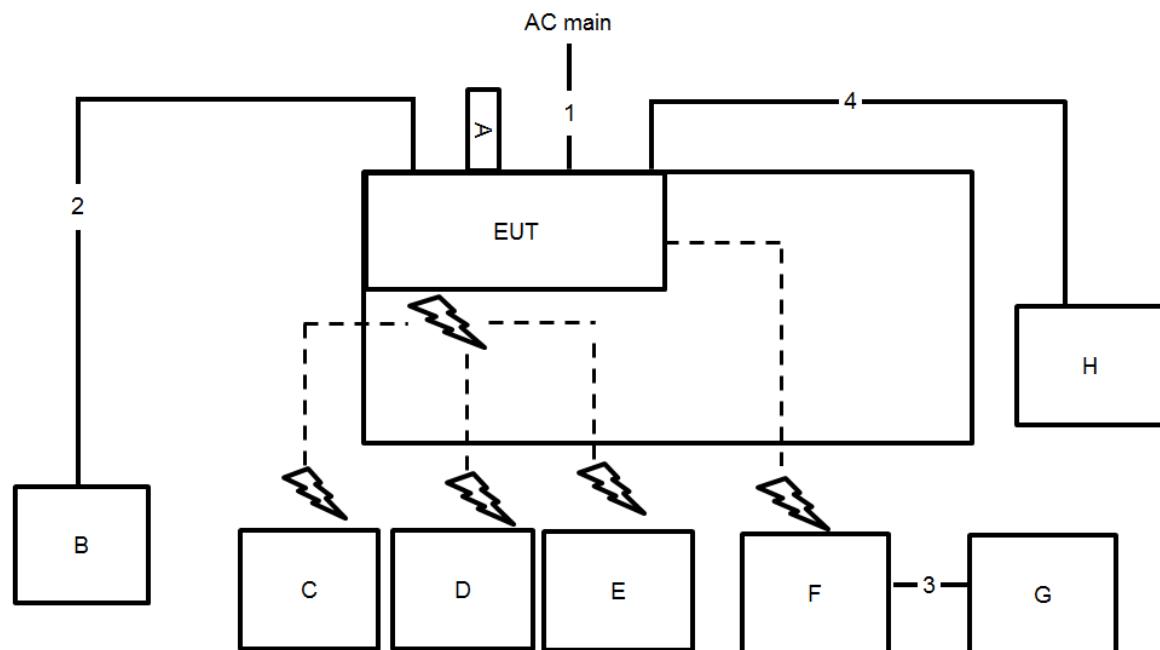
**For Radiated (above 1GHz) and RF Conducted :**

<b>Support Equipment</b>				
<b>No.</b>	<b>Equipment</b>	<b>Brand Name</b>	<b>Model Name</b>	<b>FCC ID</b>
A	Notebook	DELL	E4300	N/A
B	AC Adapter	APD	WB-18D12FU	N/A



## 2.6 Test Setup Diagram

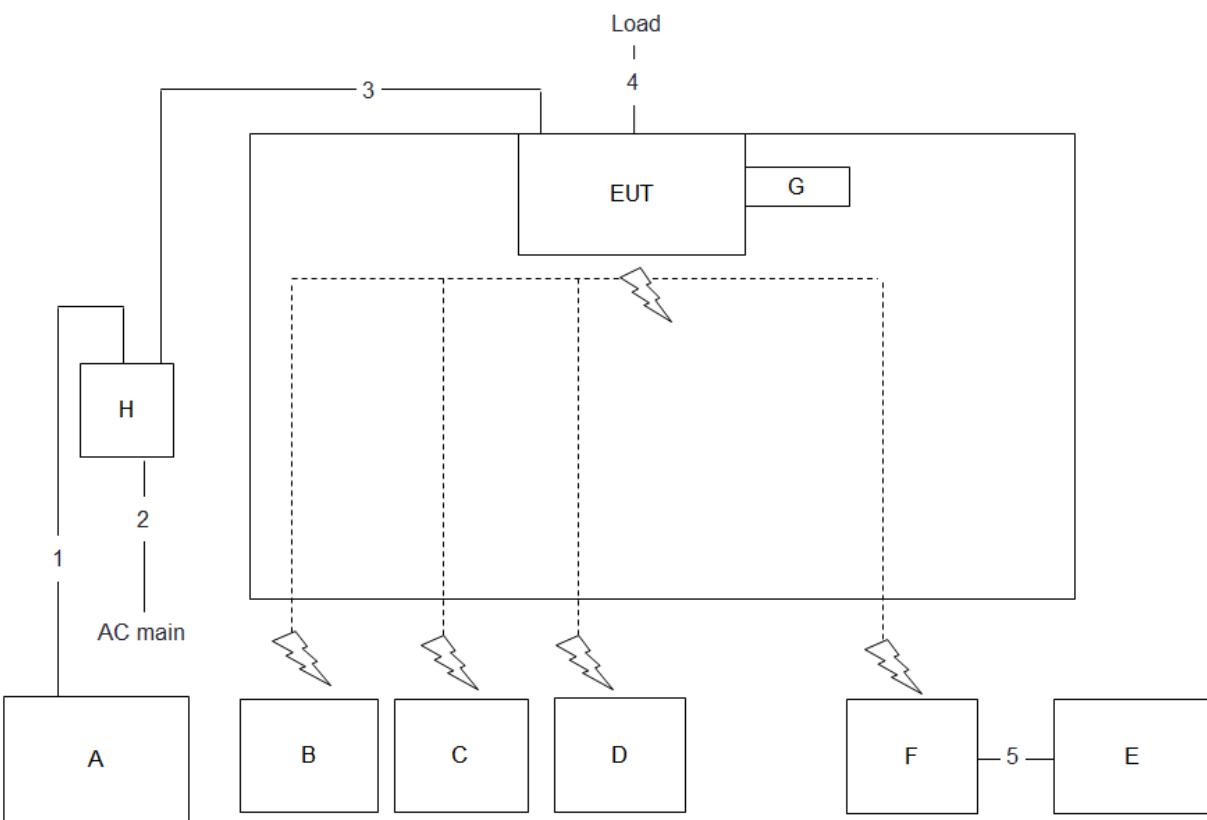
Test Setup Diagram – AC Line Conducted Emission Test



Item	Connection	Shielded	Length
1	Power cable	No	1.5m
2	RJ-45 cable	No	10m
3	RJ-45 cable	No	1.5m
4	RJ-45 cable	No	10m



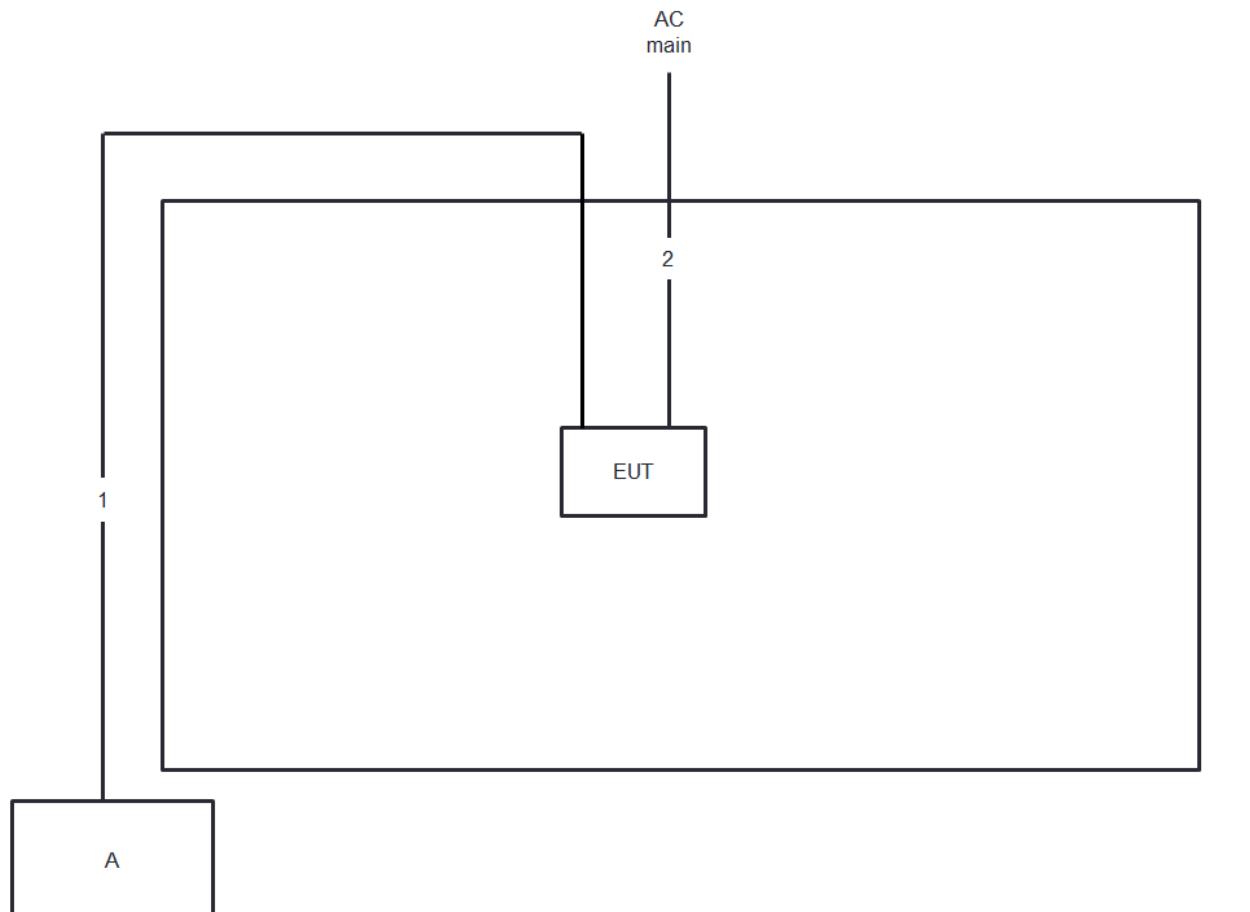
## Test Setup Diagram - Radiated Test &lt; 1GHz



Item	Connection	Shielded	Length
1	Power cable	No	0.8m
2	RJ-45 cable	No	1.5m
3	RJ-45 cable	No	10m
4	RJ-45 cable	No	1.5m
5	RJ-45 cable	No	10m



## Test Setup Diagram - Radiated Test &gt; 1GHz



Item	Connection	Shielded	Length
1	RJ-45 cable	No	10m
2	Power 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.

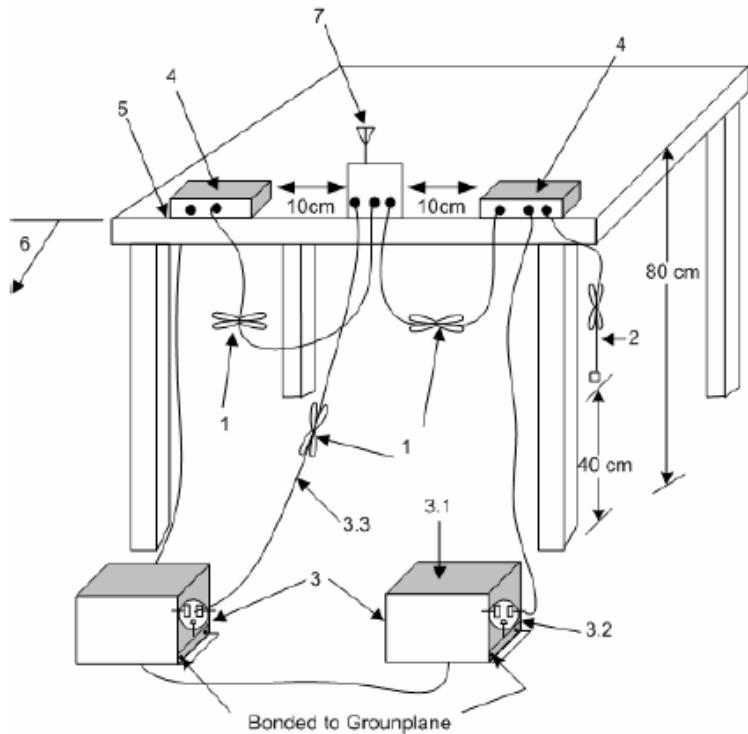
##### 3.1.2 Measuring Instruments

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



- 1—Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 cm to 40 cm long.
- 2—The I/O cables that are not connected to an accessory shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- 3—EUT connected to one LISN. Unused LISN measuring port connectors shall be terminated in  $50 \Omega$  loads. LISN may be placed on top of, or immediately beneath, reference ground plane.
  - 3.1—All other equipment powered from additional LISN(s).
  - 3.2—A multiple-outlet strip may be used for multiple power cords of non-EUT equipment.
  - 3.3—LISN at least 80 cm from nearest part of EUT chassis.
- 4—Non-EUT components of EUT system being tested.
- 5—Rear of EUT, including peripherals, shall all be aligned and flush with edge of tabletop.
- 6—Edge of tabletop shall be 40 cm removed from a vertical conducting plane that is bonded to the ground plane.
- 7—Antenna can be integral or detachable. If detachable, then the antenna shall be attached for this test.

### 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	
▪ 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

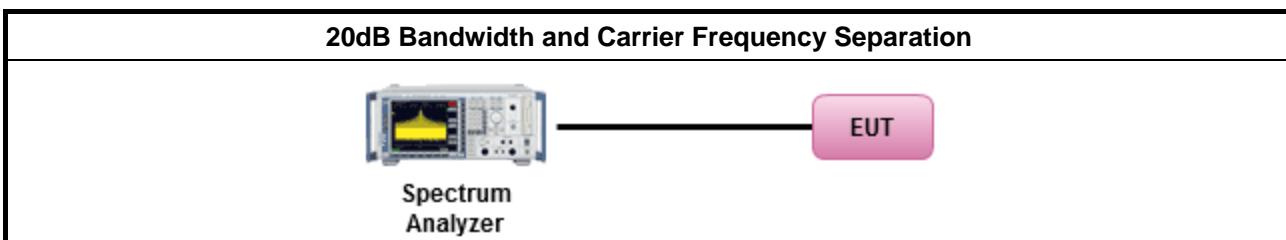
### 3.2.2 Measuring Instruments

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

Maximum Conducted Output Power (Peak Power Meter)


#### 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

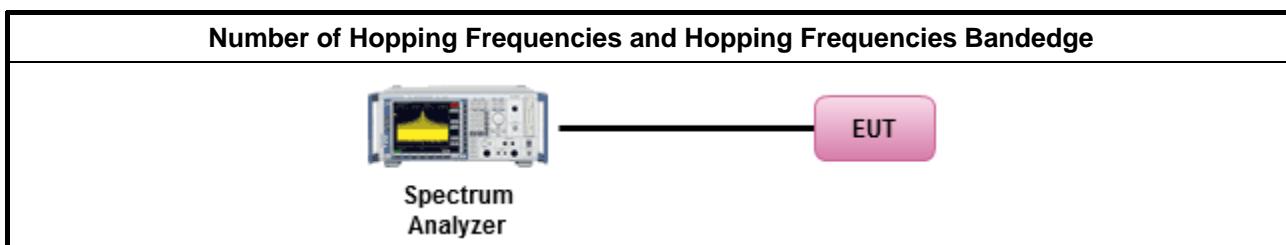
#### 3.4.3 Measuring Instruments

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

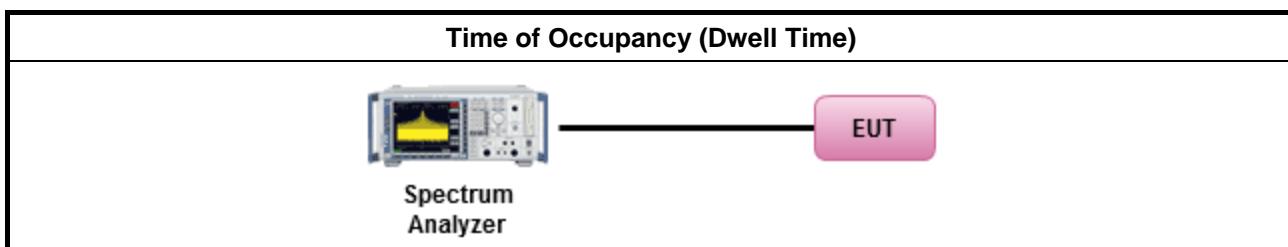
#### 3.5.2 Measuring Instruments

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.	

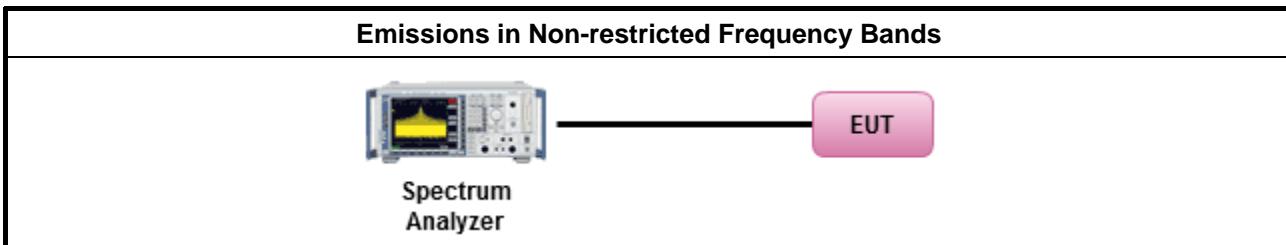
### 3.6.2 Measuring Instruments

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

### 3.6.3 Test Procedures

Test Method
▪ 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

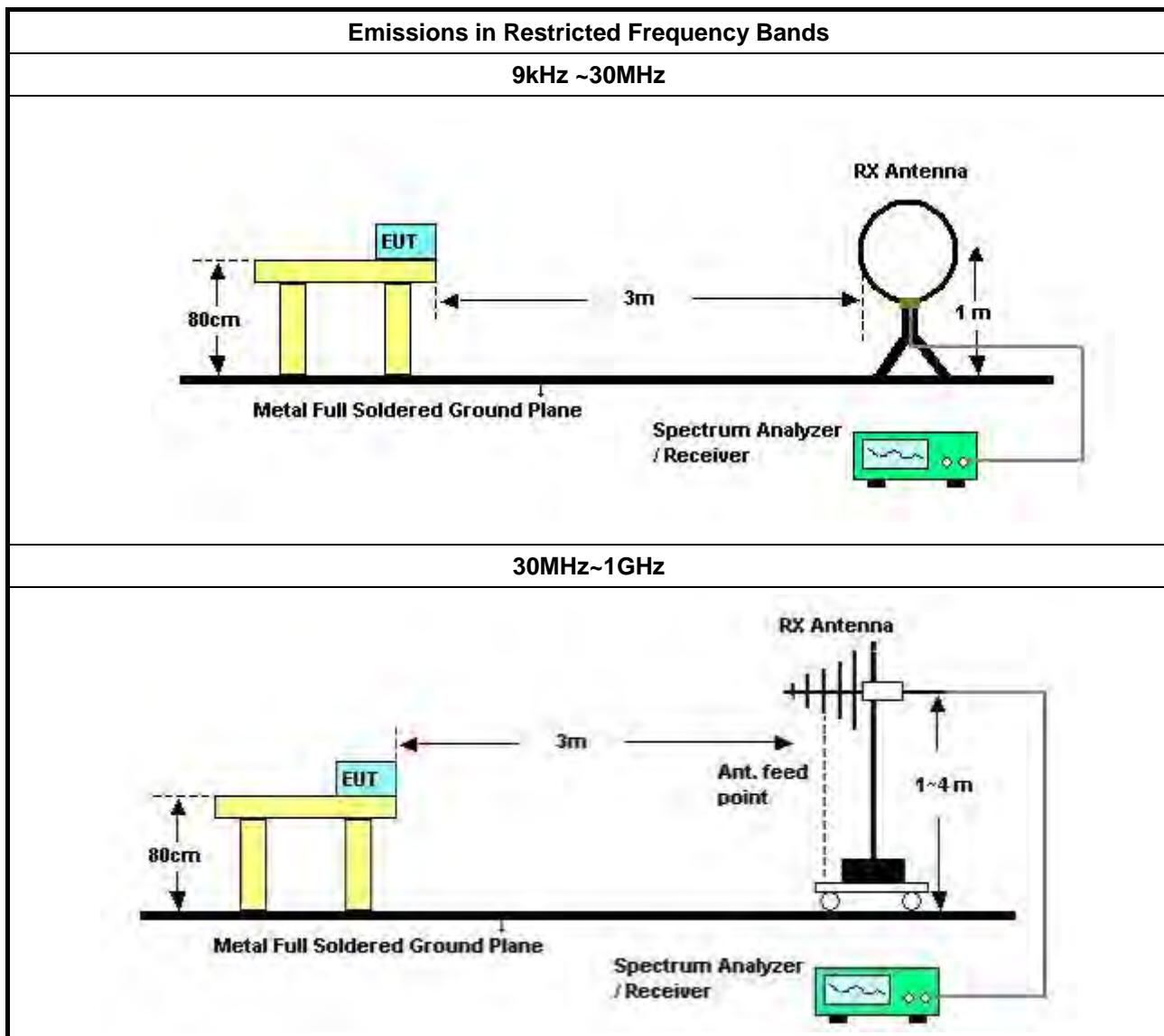
Refer a test equipment and calibration data table in this test report.

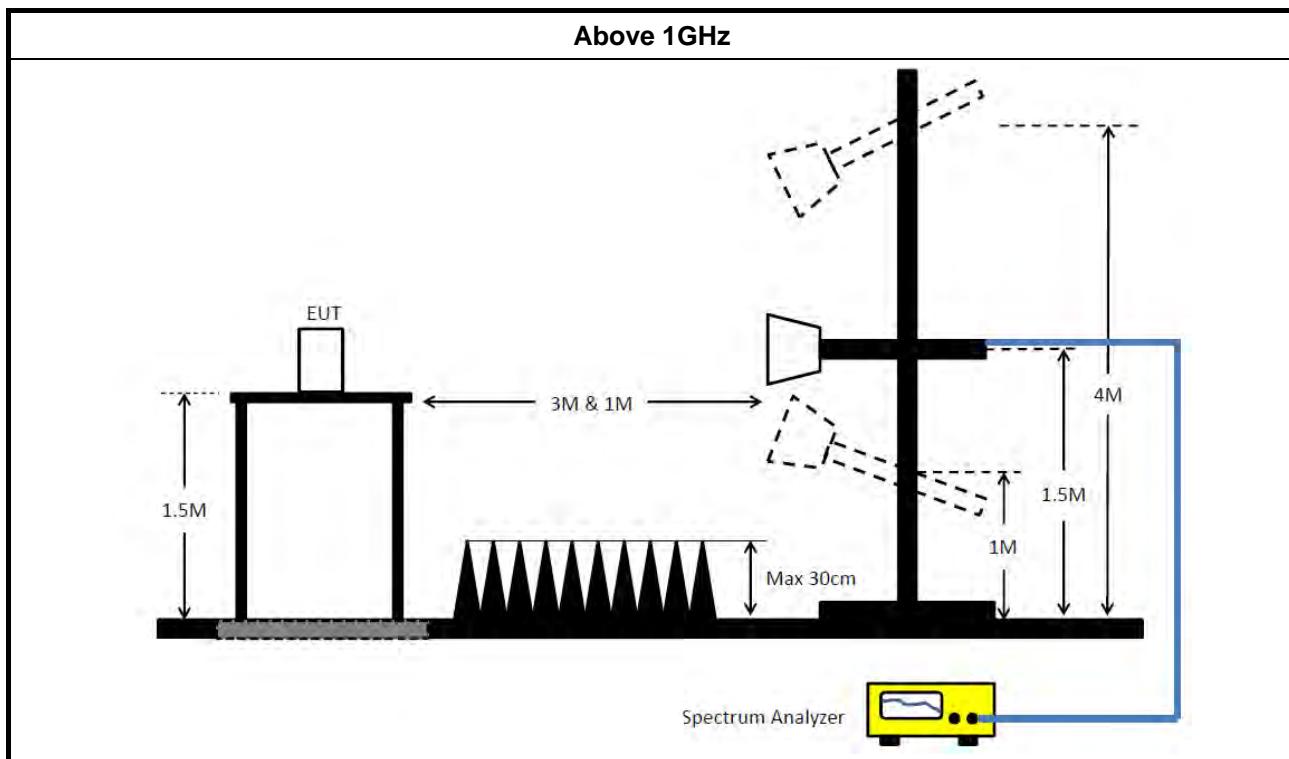
#### 3.7.3 Test Procedures

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 = 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
LISN	Schwarzbeck	NSLK 8127	8127650	9kHz ~ 30MHz	Nov. 21, 2019	Nov. 20, 2020	Conduction (CO02-CB)
LISN	Schwarzbeck	NSLK 8127	8127478	9kHz ~ 30MHz	Oct. 30, 2019	Oct. 29, 2020	Conduction (CO02-CB)
EMI Receiver	Agilent	N9038A	MY52260140	9kHz ~ 8.4GHz	Jan. 16, 2019	Jan. 15, 2020	Conduction (CO02-CB)
COND Cable	Woken	Cable	2	0.15MHz ~ 30MHz	Oct. 21, 2019	Oct. 20, 2020	Conduction (CO02-CB)
Software	Audix	E3	6.120210n	-	N.C.R.	N.C.R.	Conduction (CO02-CB)
Loop Antenna	Teseq	HLA 6120	24155	9kHz - 30 MHz	Mar. 29, 2019	Mar. 28, 2020	Radiation (03CH05-CB)
Bilog Antenna with 6dB Attenuator	TESE & EMCI	CBL 6112D & N-6-06	35236 & AT-N0610	30MHz ~ 2GHz	Mar. 28, 2019	Mar. 27, 2020	Radiation (03CH05-CB)
Pre-Amplifier	EMCI	EMC330N	980331	20MHz ~ 3GHz	May 01, 2019	Apr. 30, 2020	Radiation (03CH05-CB)
Spectrum Analyzer	R&S	FSP40	100304	9kHz ~ 40GHz	Aug. 15, 2019	Aug. 14, 2020	Radiation (03CH05-CB)
EMI Test Receiver	R&S	ESCS	826547/017	9kHz ~ 2.75GHz	May 15, 2019	May 14, 2020	Radiation (03CH05-CB)
RF Cable-low	Woken	RG402	LOW Cable-04+23	30MHz~1GHz	Oct. 07, 2019	Oct. 06, 2020	Radiation (03CH05-CB)
Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-1292	1GHz~18GHz	Jul. 17, 2019	Jul. 16, 2020	Radiation (03CH06-CB)
Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170507	15GHz ~ 40GHz	Jun. 12, 2019	Jun. 11, 2020	Radiation (03CH06-CB)
Pre-Amplifier	Agilent	83017A	MY53270064	0.5GHz ~ 26.5GHz	May 08, 2019	May 07, 2020	Radiation (03CH06-CB)
Pre-Amplifier	MITEQ	TTA1840-35-HG	1864479	18GHz ~ 40GHz	Jul. 03, 2019	Jul. 02, 2020	Radiation (03CH06-CB)
Spectrum analyzer	R&S	FSP40	100080	9kHz~40GHz	Oct. 21, 2019	Oct. 20, 2020	Radiation (03CH06-CB)
RF Cable-high	HUBER+SUHNER	RG402	High Cable-05	1GHz~18GHz	Oct. 07, 2019	Oct. 06, 2020	Radiation (03CH06-CB)
RF Cable-high	HUBER+SUHNER	RG402	High Cable-05+24	1GHz~18GHz	Oct. 07, 2019	Oct. 06, 2020	Radiation (03CH06-CB)
RF Cable-high	Woken	RG402	High Cable-40G#1	18GHz ~ 40 GHz	Jul. 24, 2019	Jul. 23, 2020	Radiation (03CH06-CB)
RF Cable-high	Woken	RG402	High Cable-40G#2	18GHz ~ 40 GHz	Jul. 24, 2019	Jul. 23, 2020	Radiation (03CH06-CB)
Spectrum analyzer	R&S	FSV40	100979	9kHz~40GHz	Feb. 25, 2019	Feb. 24, 2020	Conducted (TH01-CB)

**FCC RADIO TEST REPORT****Report No. : FR741722-10AC**

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
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)
Power Sensor	Agilent	E9327A	US40442088	50MHz~18GHz	Jan. 15, 2019	Jan. 14, 2020	Conducted (TH01-CB)
Power Meter	Agilent	E4416A	GB41291199	50MHz~18GHz	Jan. 15, 2019	Jan. 14, 2020	Conducted (TH01-CB)

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

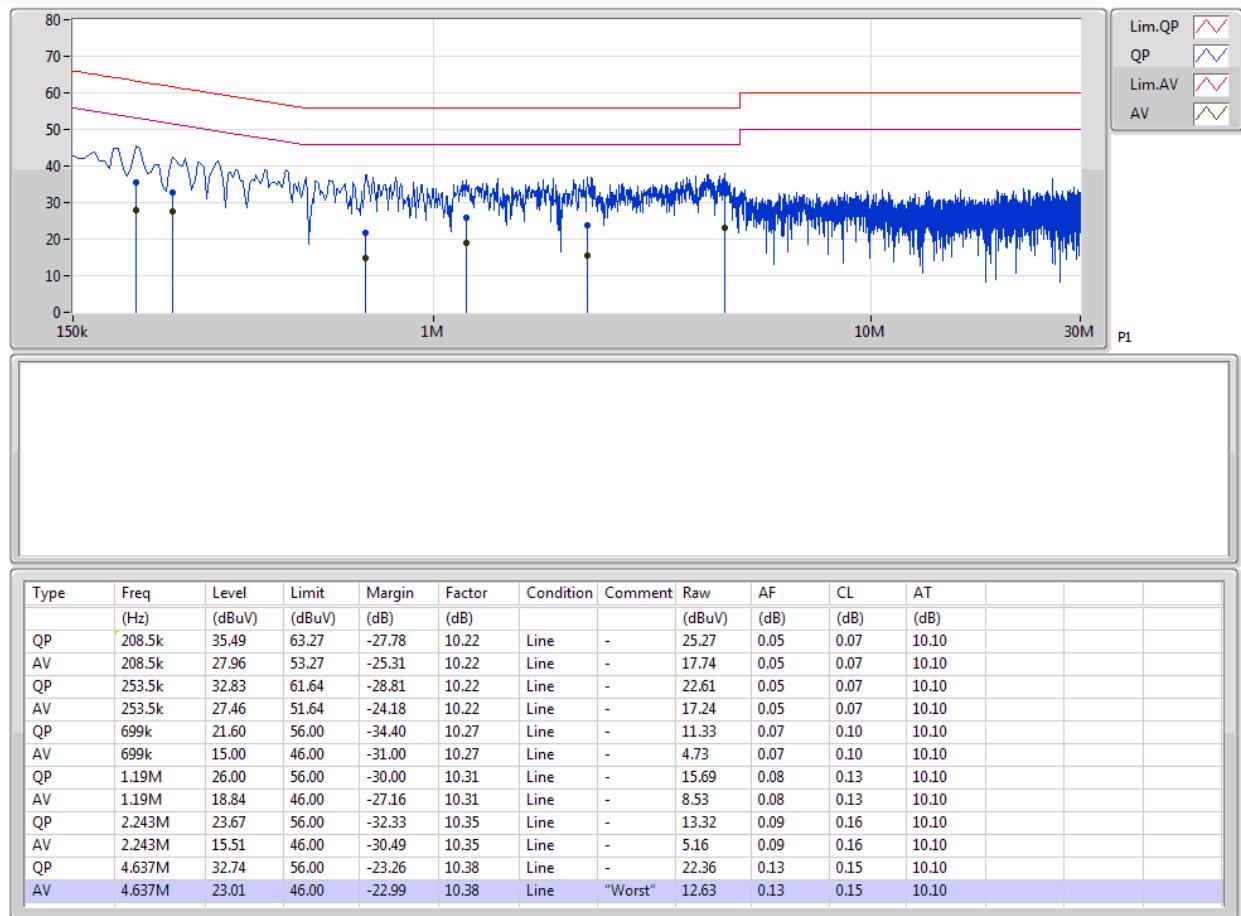
N.C.R. means Non-Calibration required.

**Summary**

Mode	Result	Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Factor (dB)	Condition
Mode 1	Pass	AV	388.5k	29.07	48.10	-19.03	10.22	Neutral

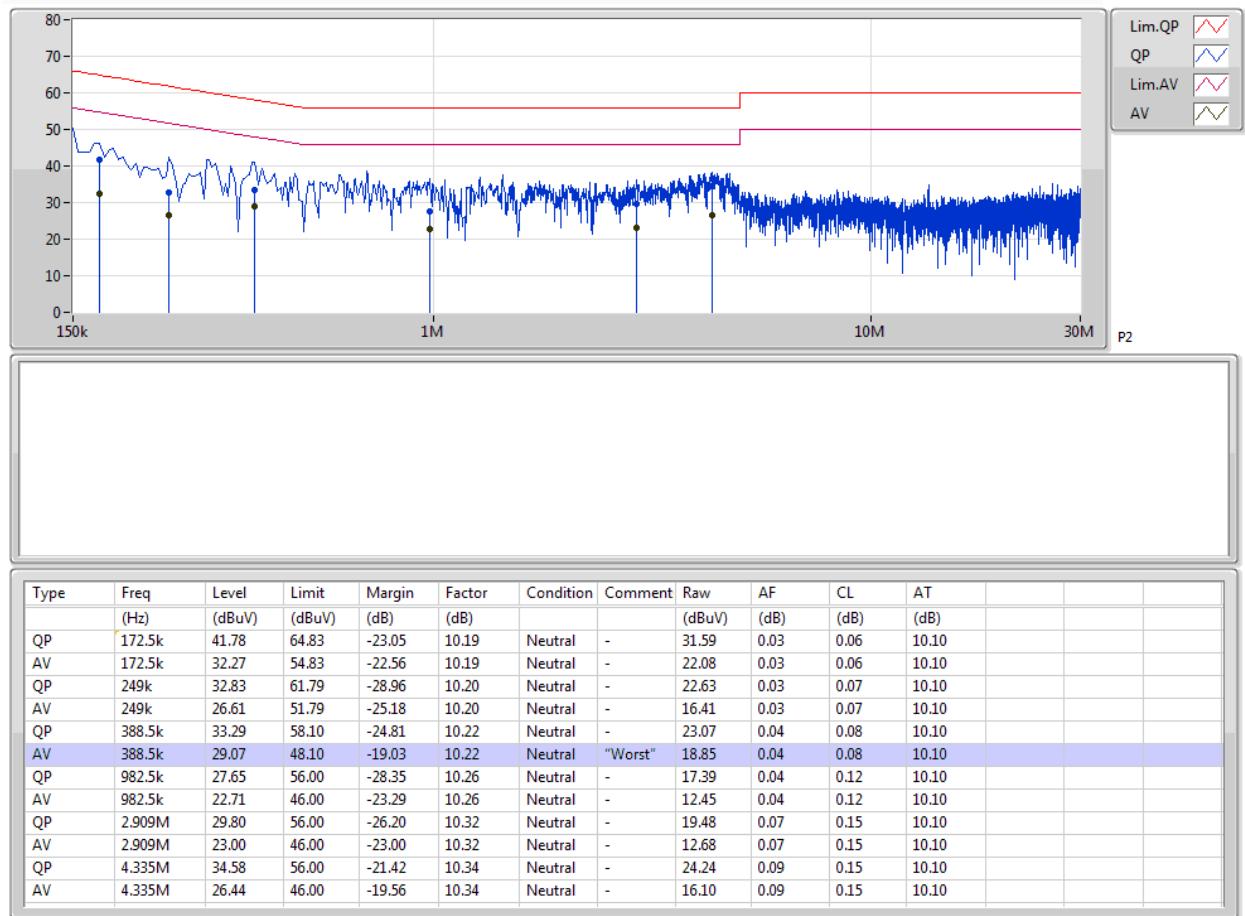
**Mode 1**

04/12/2019



**Mode 1**

04/12/2019



**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)	921.25k	865.817k	866KF1D	920k	859.57k
BT-EDR(2Mbps)	1.316M	1.189M	1M19G1D	1.313M	1.183M
BT-EDR(3Mbps)	1.27M	1.191M	1M19G1D	1.269M	1.176M

**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;

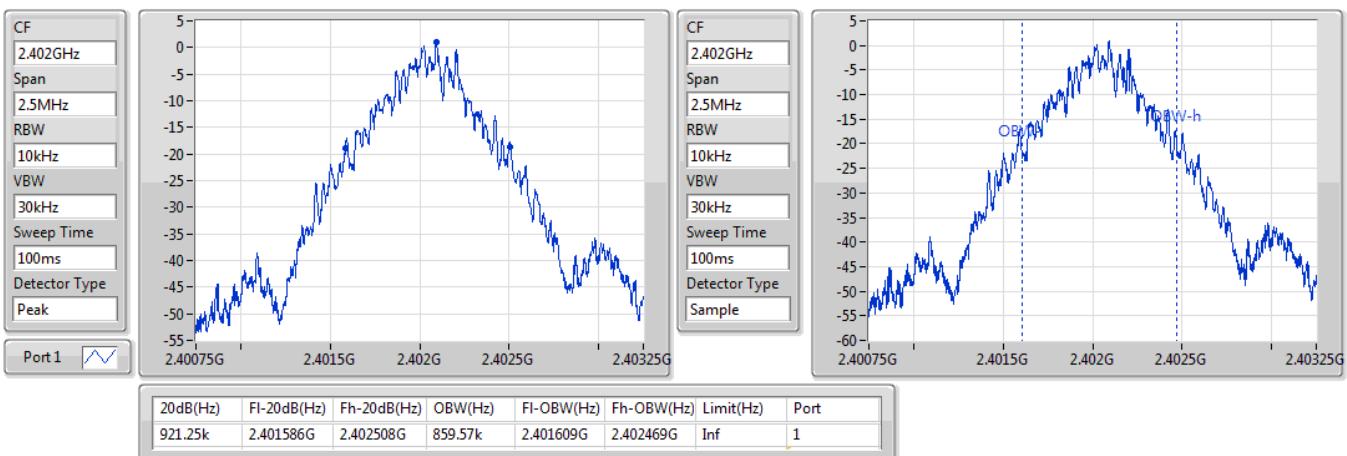
**Result**

Mode	Result	Limit (Hz)	Port 1-N dB (Hz)	Port 1-OBW (Hz)
BT-BR(1Mbps)	-	-	-	-
2402MHz	Pass	Inf	921.25k	859.57k
2440MHz	Pass	Inf	920k	865.817k
2480MHz	Pass	Inf	920k	864.568k
BT-EDR(2Mbps)	-	-	-	-
2402MHz	Pass	Inf	1.313M	1.186M
2440MHz	Pass	Inf	1.315M	1.183M
2480MHz	Pass	Inf	1.316M	1.189M
BT-EDR(3Mbps)	-	-	-	-
2402MHz	Pass	Inf	1.269M	1.176M
2440MHz	Pass	Inf	1.27M	1.191M
2480MHz	Pass	Inf	1.27M	1.181M

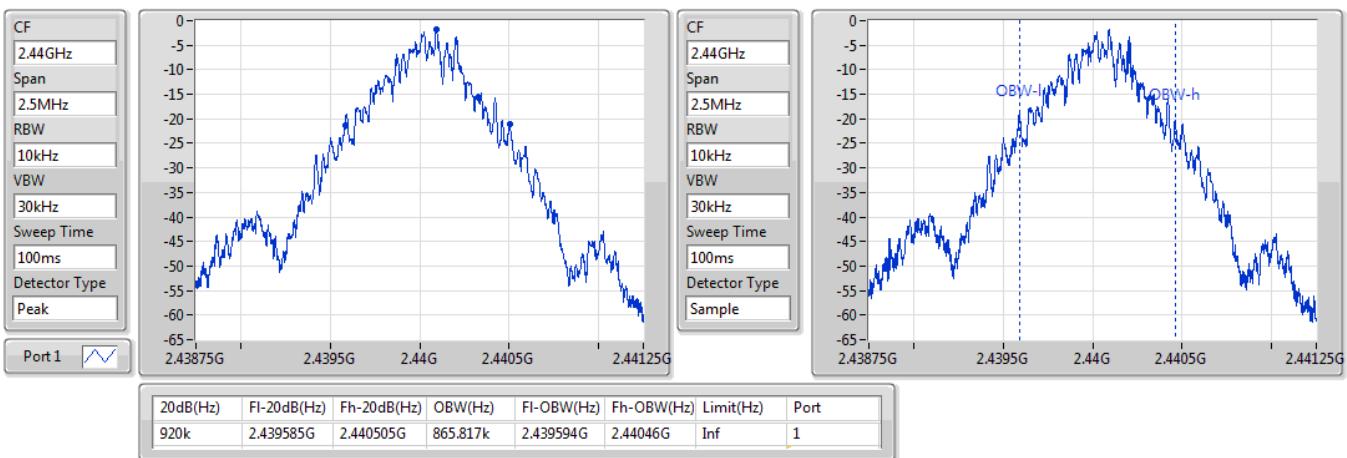
**Port X-N dB** = Port X 20dB down bandwidth; **Port X-OBW** = Port X 99% occupied bandwidth;

**BT-BR(1Mbps)**
**EBW**
**2402MHz**

26/11/2019

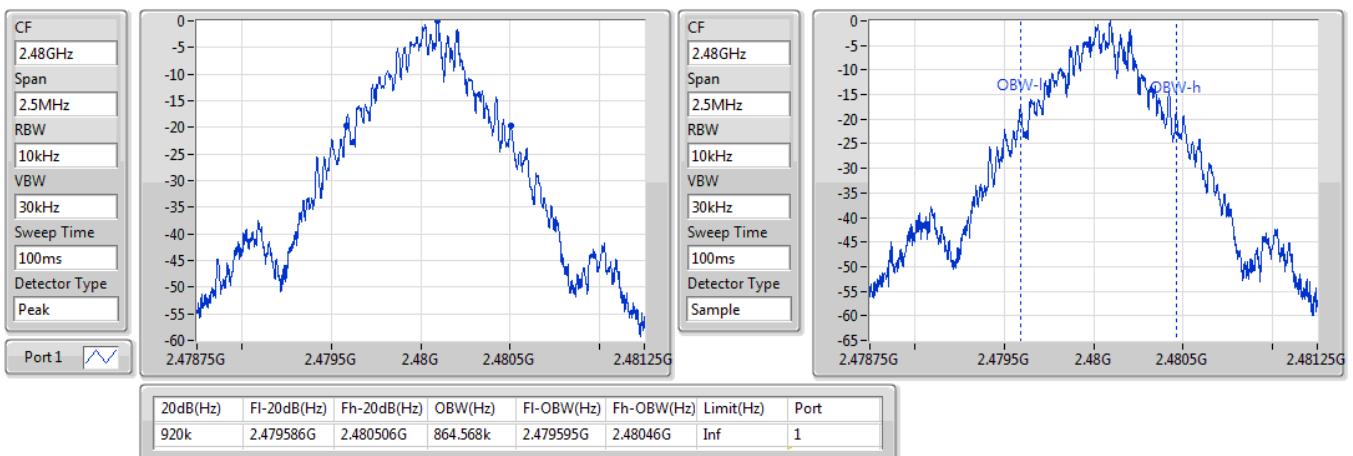

**BT-BR(1Mbps)**
**EBW**
**2440MHz**

26/11/2019

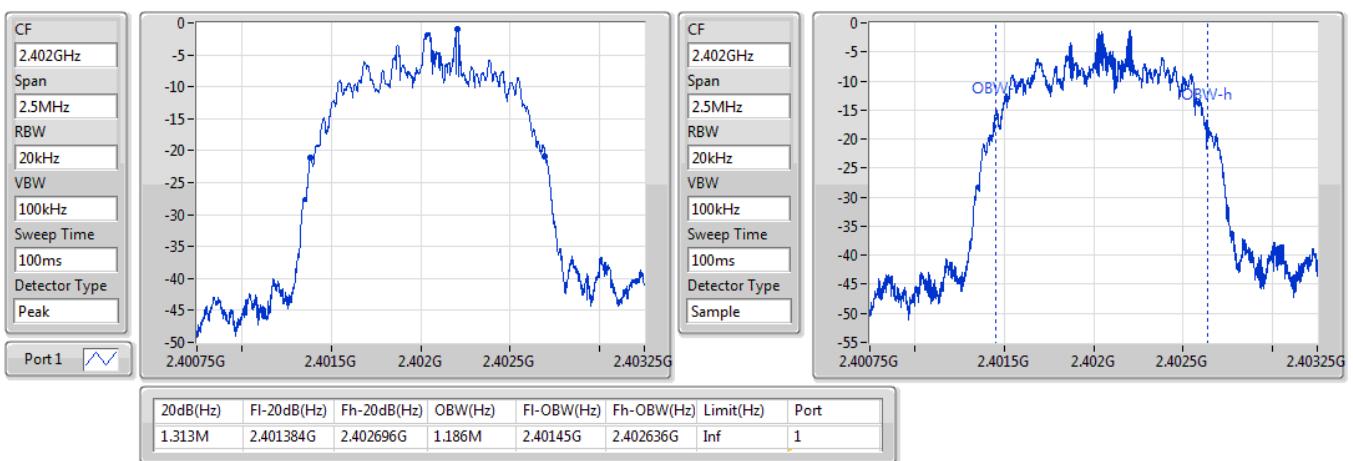


**BT-BR(1Mbps)**
**EBW**
**2480MHz**

26/11/2019

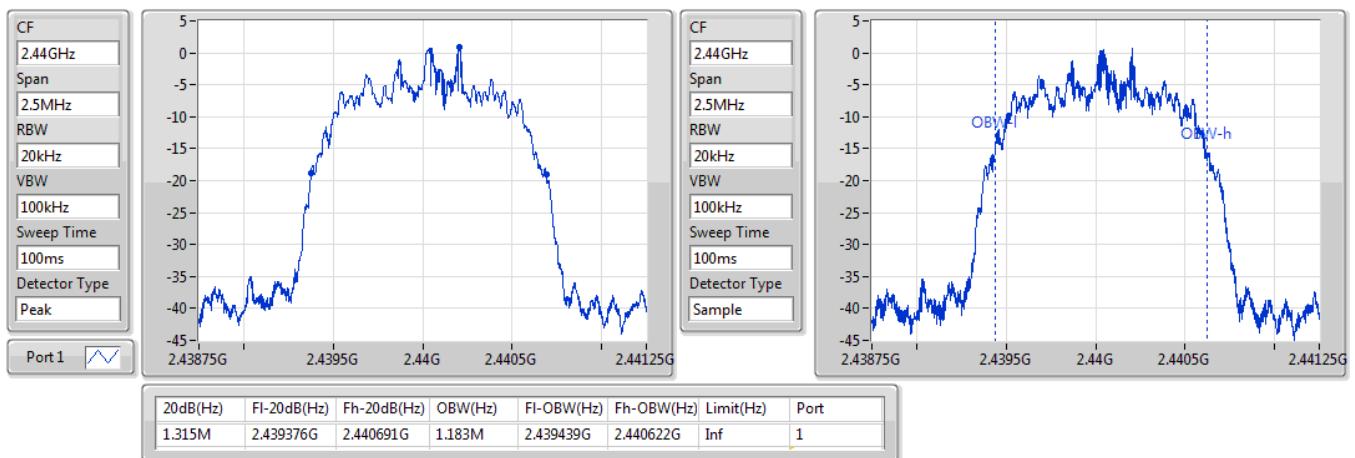

**BT-EDR(2Mbps)**
**EBW**
**2402MHz**

26/11/2019

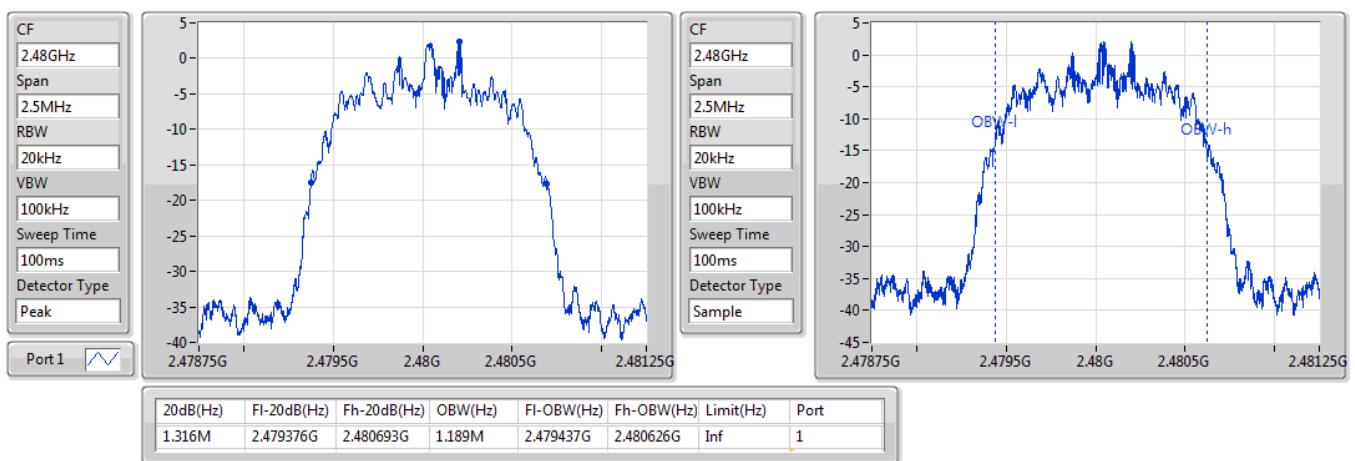


**BT-EDR(2Mbps)**
**EBW**
**2440MHz**

26/11/2019

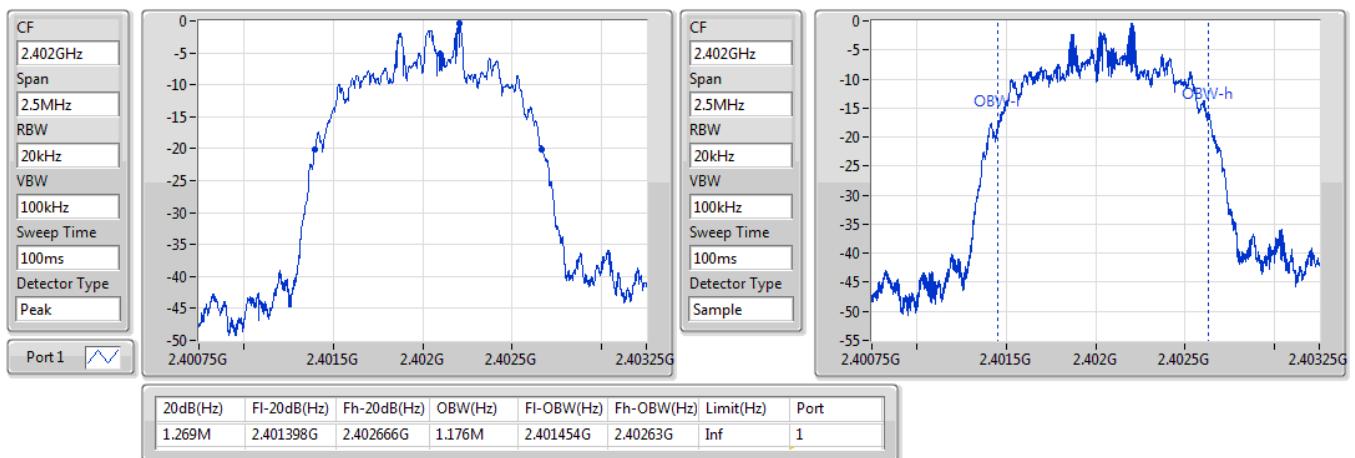

**BT-EDR(2Mbps)**
**EBW**
**2480MHz**

26/11/2019

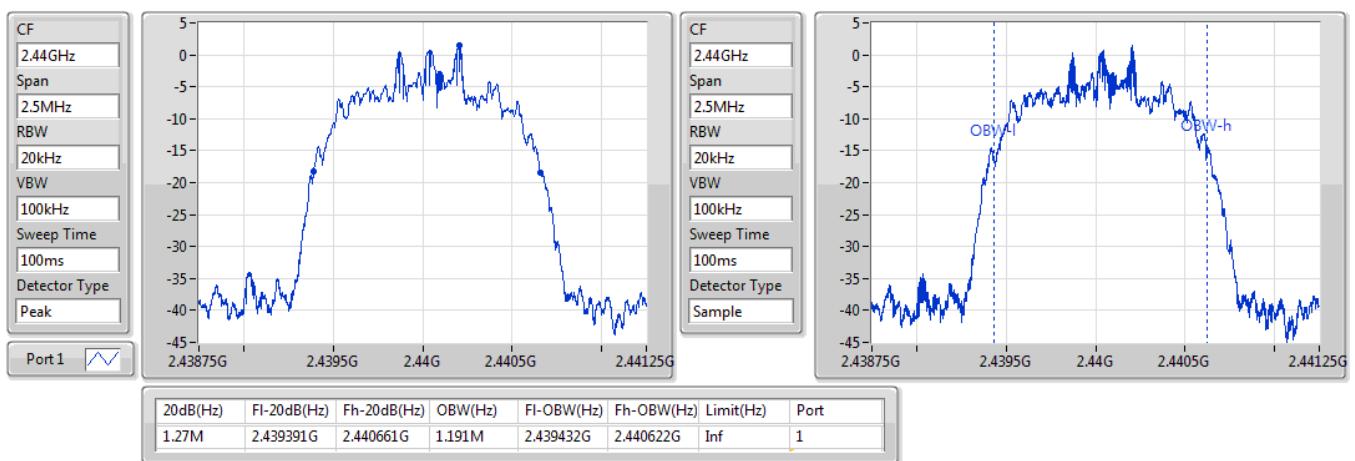


**BT-EDR(3Mbps)**
**EBW**
**2402MHz**

26/11/2019


**BT-EDR(3Mbps)**
**EBW**
**2440MHz**

26/11/2019

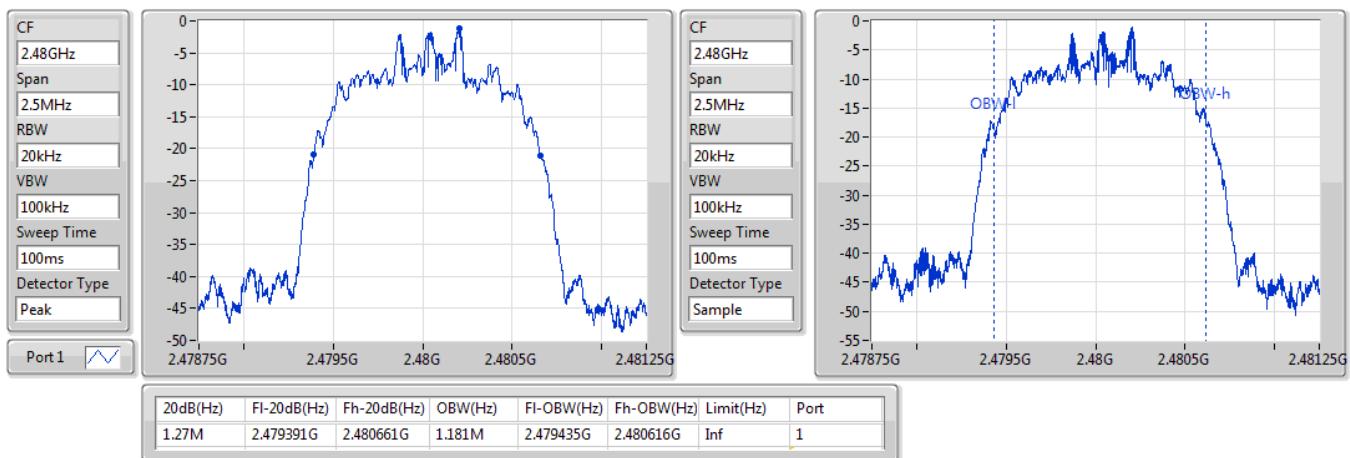


**BT-EDR(3Mbps)**

**EBW**

**2480MHz**

26/11/2019



**Summary**

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

**Result**

Mode	Result	Fl (Hz)	Fh (Hz)	Ch.Space (Hz)	Limit (Hz)
BT-BR(1Mbps)	-	-	-	-	-
2402MHz	Pass	2.402202G	2.403201G	999k	613.5525k
2440MHz	Pass	2.440202G	2.441202G	1.0005M	612.72k
2480MHz	Pass	2.479203G	2.480201G	997.5k	612.72k
BT-EDR(2Mbps)	-	-	-	-	-
2402MHz	Pass	2.40204G	2.40304G	1.0005M	874.458k
2440MHz	Pass	2.44004G	2.441042G	1.002M	875.79k
2480MHz	Pass	2.47904G	2.48004G	1.0005M	876.456k
BT-EDR(3Mbps)	-	-	-	-	-
2402MHz	Pass	2.402202G	2.403201G	999k	845.154k
2440MHz	Pass	2.4402G	2.441201G	1.0005M	845.82k
2480MHz	Pass	2.4792G	2.480201G	1.0005M	845.82k

**BT-BR(1Mbps)**
**2.402G/2.403GHz**

**Channel Separation**

Port 1 

Ch Freq	2.402G/2.403G
Span	3MHz
RBW	30kHz
VBW	100kHz
Sweep	100ms
Detector	Peak

**BT-BR(1Mbps)**
**2.44G/2.441GHz**

**Channel Separation**

26/11/2019  
Port 1 

Ch Freq	2.44G/2.441G
Span	3MHz
RBW	30kHz
VBW	100kHz
Sweep	100ms
Detector	Peak

**BT-BR(1Mbps)**
**2.48G/2.479GHz**

**Channel Separation**

26/11/2019  
Port 1 

Ch Freq	2.48G/2.479G
Span	3MHz
RBW	30kHz
VBW	100kHz
Sweep	100ms
Detector	Peak

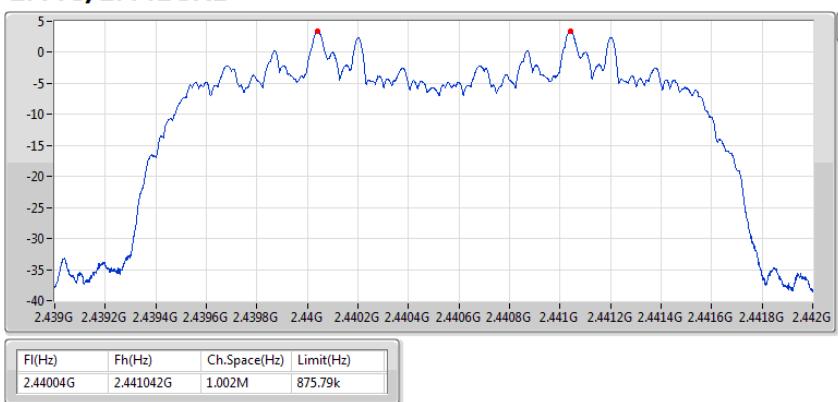
**BT-EDR(2Mbps)**
**2.402G/2.403GHz**

**Channel Separation**

26/11/2019

Port 1 

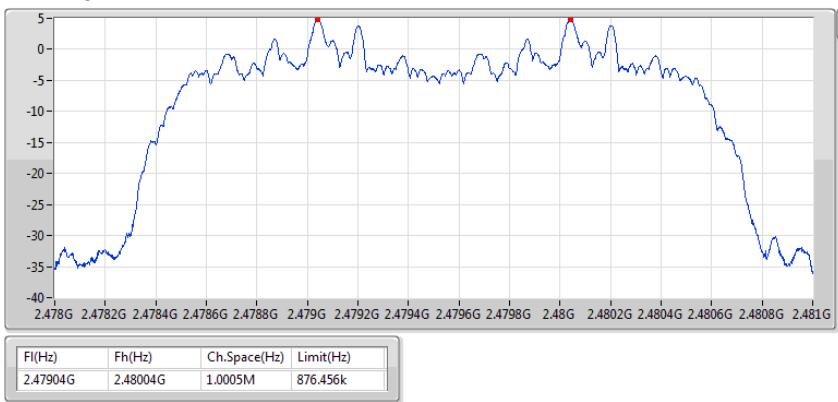
Ch Freq	2.402G/2.403G
Span	3MHz
RBW	30kHz
VBW	100kHz
Sweep	100ms
Detector	Peak

**BT-EDR(2Mbps)**
**2.44G/2.441GHz**

**Channel Separation**

26/11/2019

Port 1 

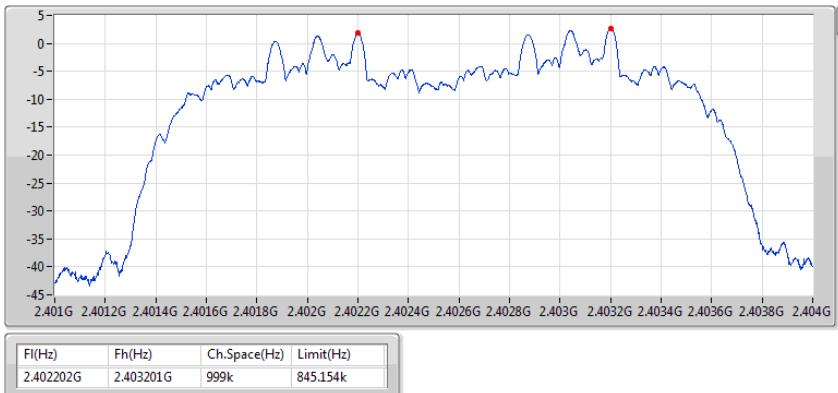
Ch Freq	2.44G/2.441G
Span	3MHz
RBW	30kHz
VBW	100kHz
Sweep	100ms
Detector	Peak

**BT-EDR(2Mbps)**
**2.48G/2.479GHz**

**Channel Separation**

26/11/2019

Port 1 

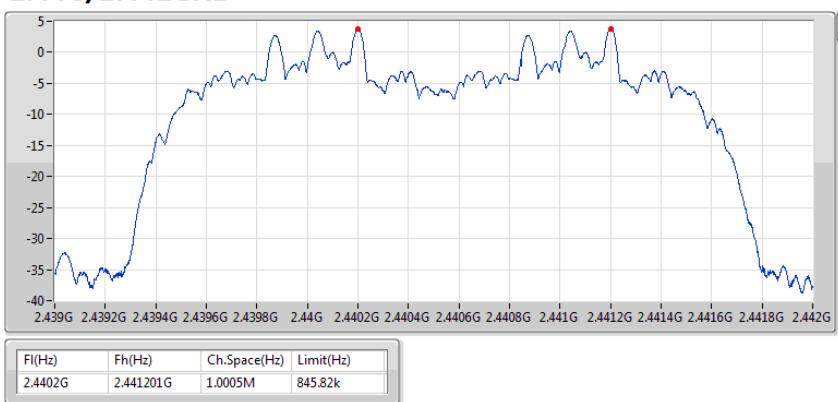
Ch Freq	2.48G/2.479G
Span	3MHz
RBW	30kHz
VBW	100kHz
Sweep	100ms
Detector	Peak

**BT-EDR(3Mbps)**
**2.402G/2.403GHz**

**Channel Separation**

26/11/2019

Port 1 

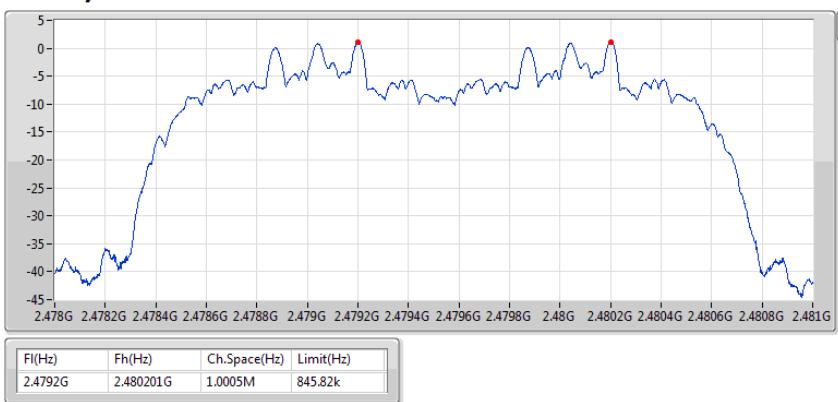
Ch Freq	2.402G/2.403G
Span	3MHz
RBW	30kHz
VBW	100kHz
Sweep	100ms
Detector	Peak

**BT-EDR(3Mbps)**
**2.44G/2.441GHz**

**Channel Separation**

26/11/2019

Port 1 

Ch Freq	2.44G/2.441G
Span	3MHz
RBW	30kHz
VBW	100kHz
Sweep	100ms
Detector	Peak

**BT-EDR(3Mbps)**
**2.48G/2.479GHz**

**Channel Separation**

26/11/2019

Port 1 

Ch Freq	2.48G/2.479G
Span	3MHz
RBW	30kHz
VBW	100kHz
Sweep	100ms
Detector	Peak

**Summary**

Mode	Power (dBm)	Power (W)
2.4-2.4835GHz	-	-
BT-BR(1Mbps)	6.91	0.00491
BT-EDR(2Mbps)	6.81	0.00480
BT-EDR(3Mbps)	5.36	0.00344

**Result**

Mode	Result	Gain (dBi)	Power (dBm)	Power Limit (dBm)
BT-BR(1Mbps)	-	-	-	-
2402MHz	Pass	2.10	6.91	21.00
2440MHz	Pass	2.10	4.11	21.00
2480MHz	Pass	2.10	5.79	21.00
BT-EDR(2Mbps)	-	-	-	-
2402MHz	Pass	2.10	3.37	21.00
2440MHz	Pass	2.10	5.39	21.00
2480MHz	Pass	2.10	6.81	21.00
BT-EDR(3Mbps)	-	-	-	-
2402MHz	Pass	2.10	3.38	21.00
2440MHz	Pass	2.10	5.36	21.00
2480MHz	Pass	2.10	2.76	21.00

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

**Summary**

Mode	Power (dBm)	Power (W)
2.4-2.4835GHz	-	-
BT-BR(1Mbps)	7.16	0.00520
BT-EDR(2Mbps)	7.92	0.00619
BT-EDR(3Mbps)	6.72	0.00470

**Result**

Mode	Result	Gain (dBi)	Power (dBm)	Power Limit (dBm)
BT-BR(1Mbps)	-	-	-	-
2402MHz	Pass	2.10	7.16	21.00
2440MHz	Pass	2.10	4.45	21.00
2480MHz	Pass	2.10	6.08	21.00
BT-EDR(2Mbps)	-	-	-	-
2402MHz	Pass	2.10	4.63	21.00
2440MHz	Pass	2.10	6.55	21.00
2480MHz	Pass	2.10	7.92	21.00
BT-EDR(3Mbps)	-	-	-	-
2402MHz	Pass	2.10	4.85	21.00
2440MHz	Pass	2.10	6.72	21.00
2480MHz	Pass	2.10	4.27	21.00

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



**Summary**

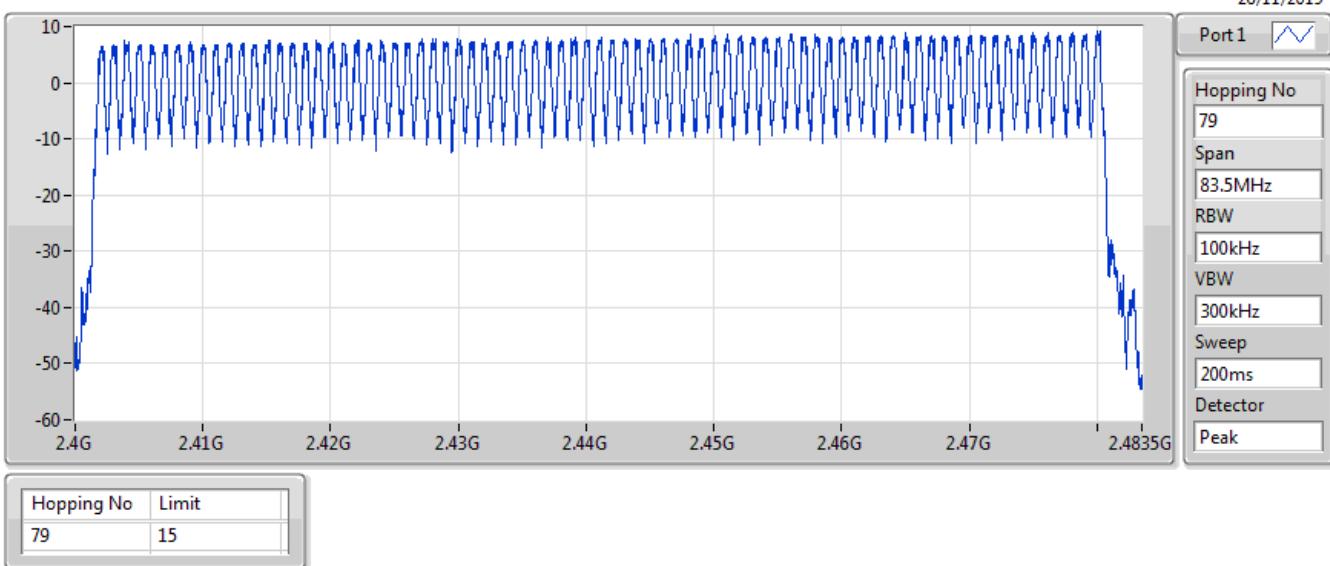
Mode	Max-Hop No
2.4-2.4835GHz	-
BT-BR(1Mbps)	79
BT-EDR(2Mbps)	79
BT-EDR(3Mbps)	79

**Result**

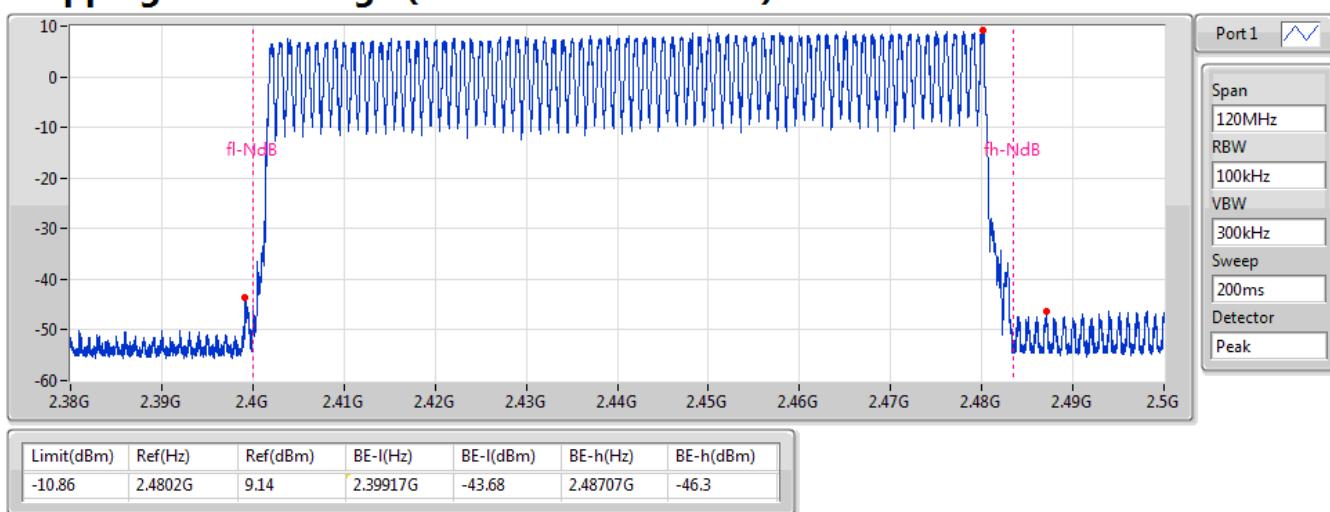
Mode	Result	Hopping No	Limit
BT-BR(1Mbps)	-	-	-
2440MHz	Pass	79	15
BT-EDR(2Mbps)	-	-	-
2440MHz	Pass	79	15
BT-EDR(3Mbps)	-	-	-
2440MHz	Pass	79	15

**BT-BR(1Mbps)**
**2440MHz**
**Hopping Ch**

26/11/2019

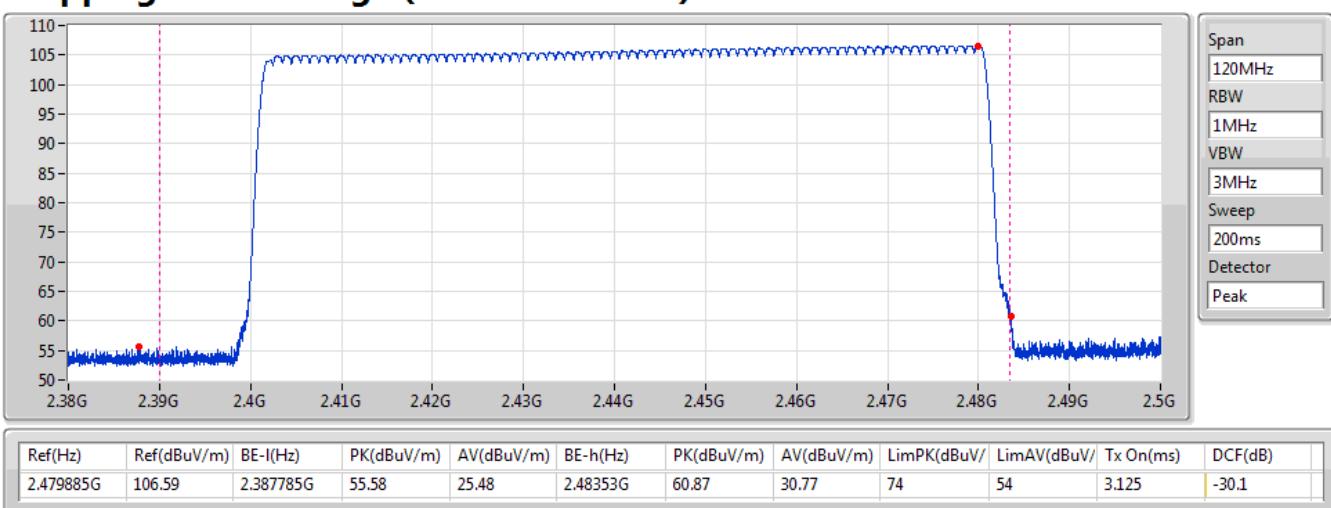

**BT-BR(1Mbps)**
**2440MHz**
**Hopping Ch Bandedge (Non-restricted Band)**

26/11/2019

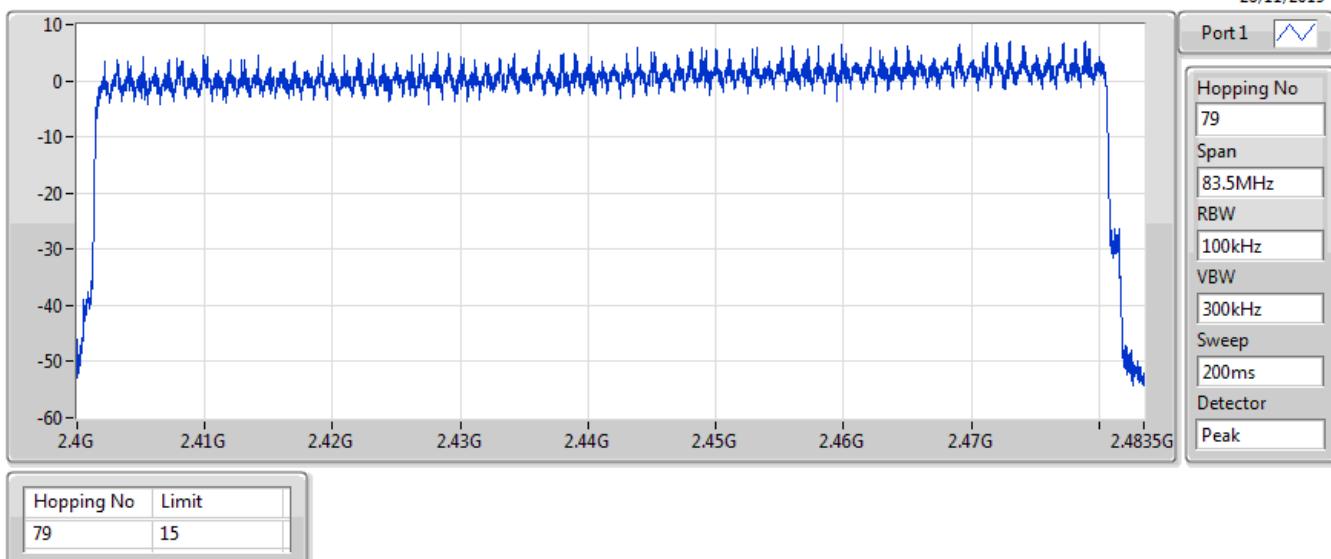


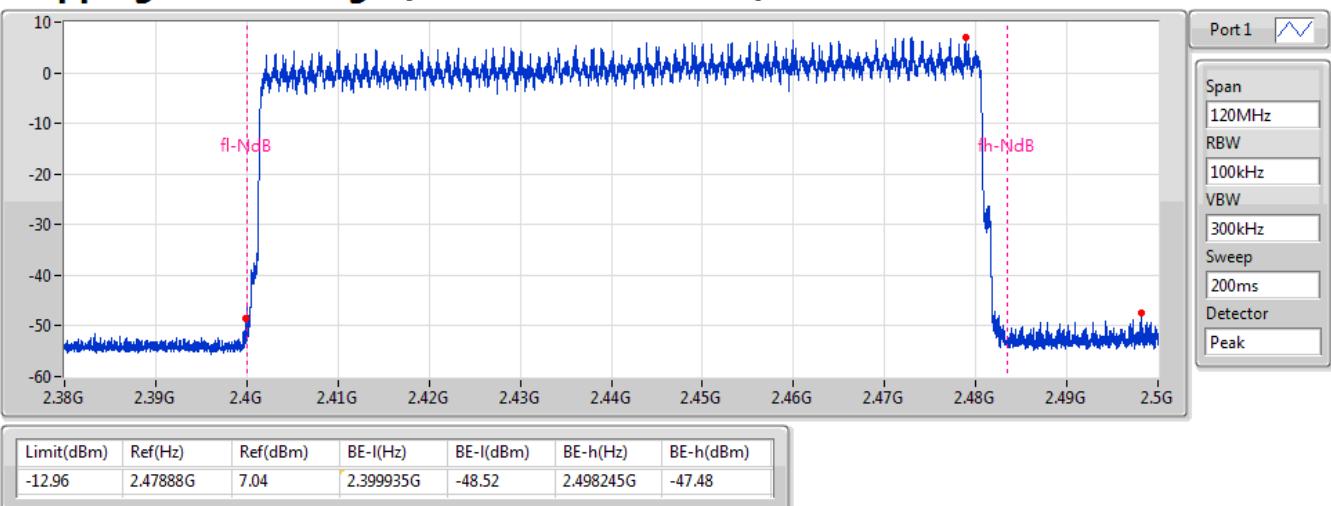
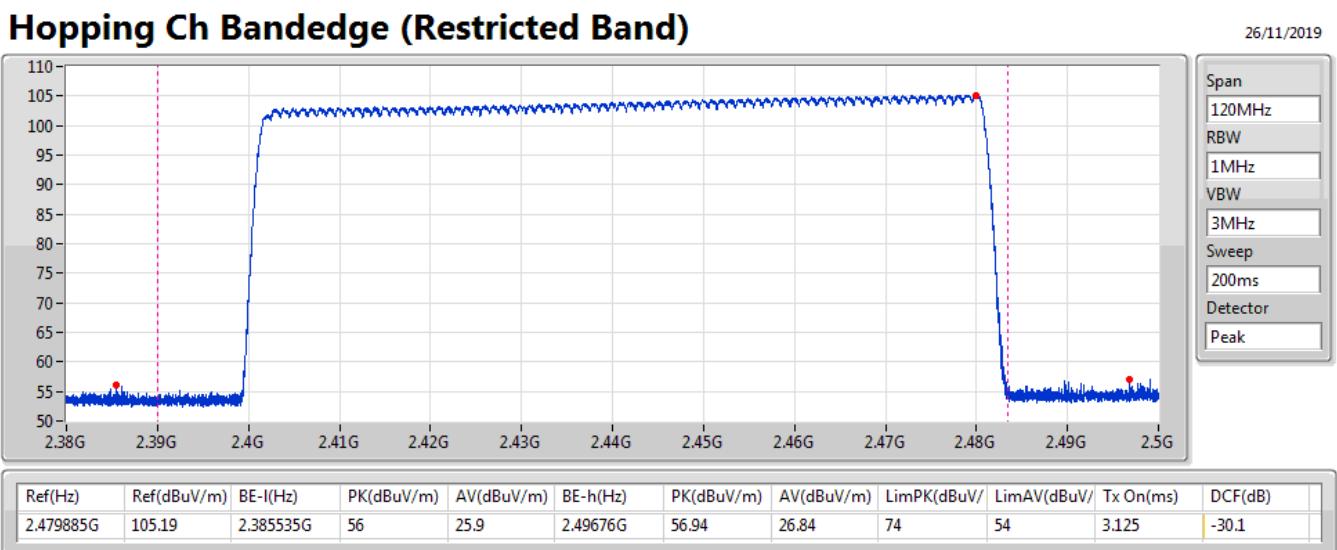
**BT-BR(1Mbps)**
**2440MHz**
**Hopping Ch Bandedge (Restricted Band)**

26/11/2019


**BT-EDR(2Mbps)**
**2440MHz**
**Hopping Ch**

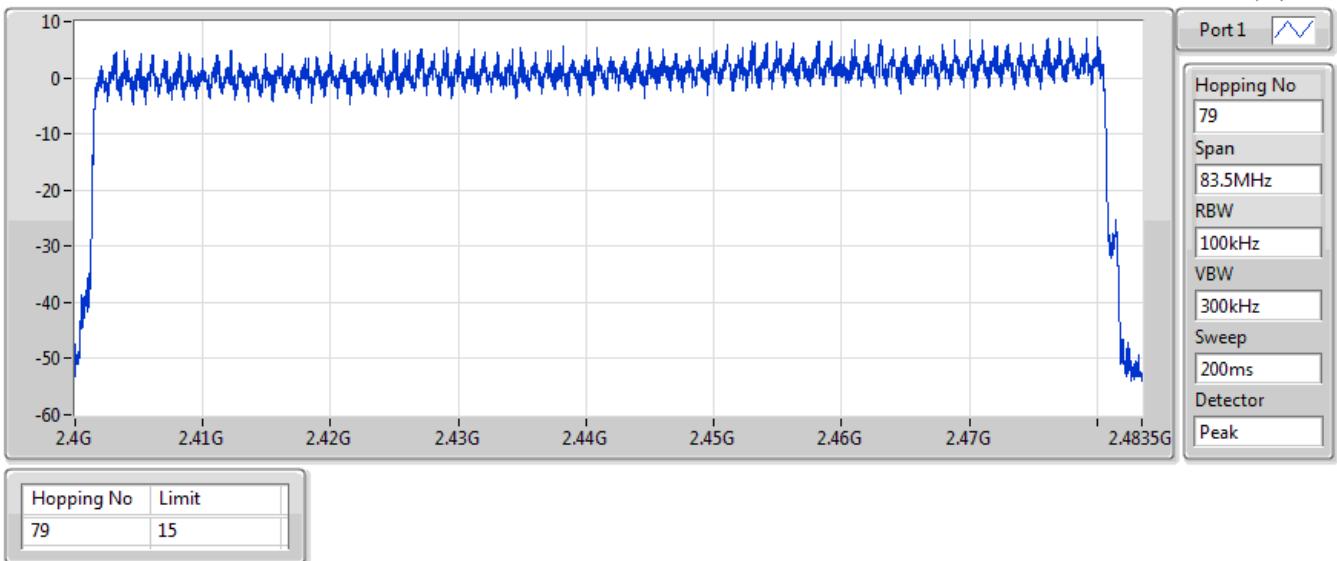
26/11/2019



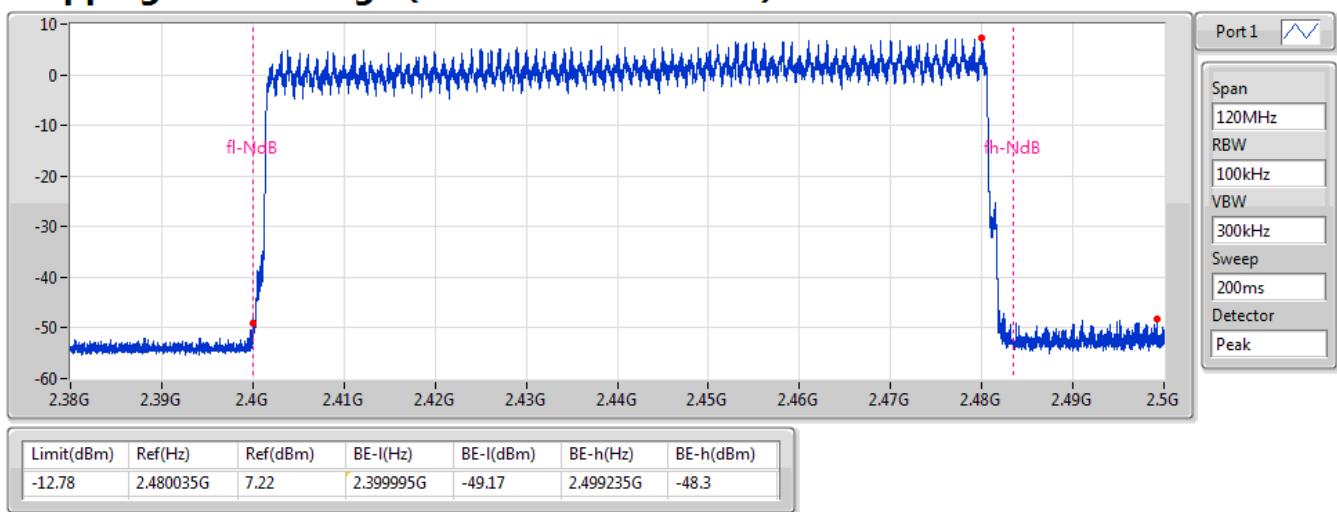
**BT-EDR(2Mbps)**
**2440MHz**
**Hopping Ch Bandedge (Non-restricted Band)**

**BT-EDR(2Mbps)**
**2440MHz**
**Hopping Ch Bandedge (Restricted Band)**


**BT-EDR(3Mbps)**
**2440MHz**
**Hopping Ch**

26/11/2019


**BT-EDR(3Mbps)**
**2440MHz**
**Hopping Ch Bandedge (Non-restricted Band)**

26/11/2019

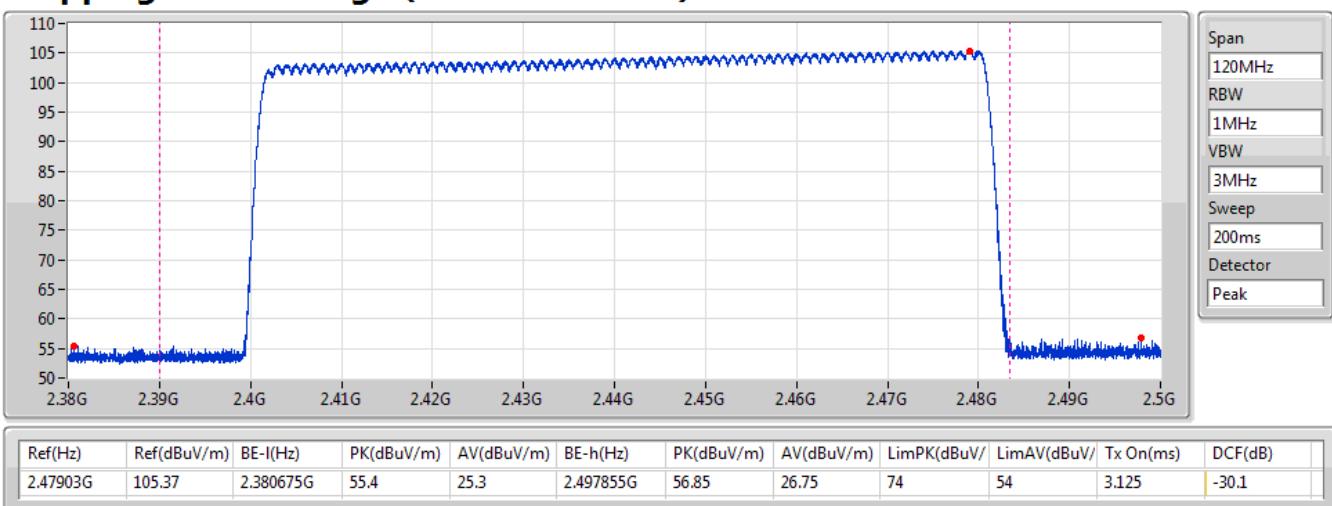


**BT-EDR(3Mbps)**

**2440MHz**

**Hopping Ch Bandedge (Restricted Band)**

26/11/2019



**Summary**

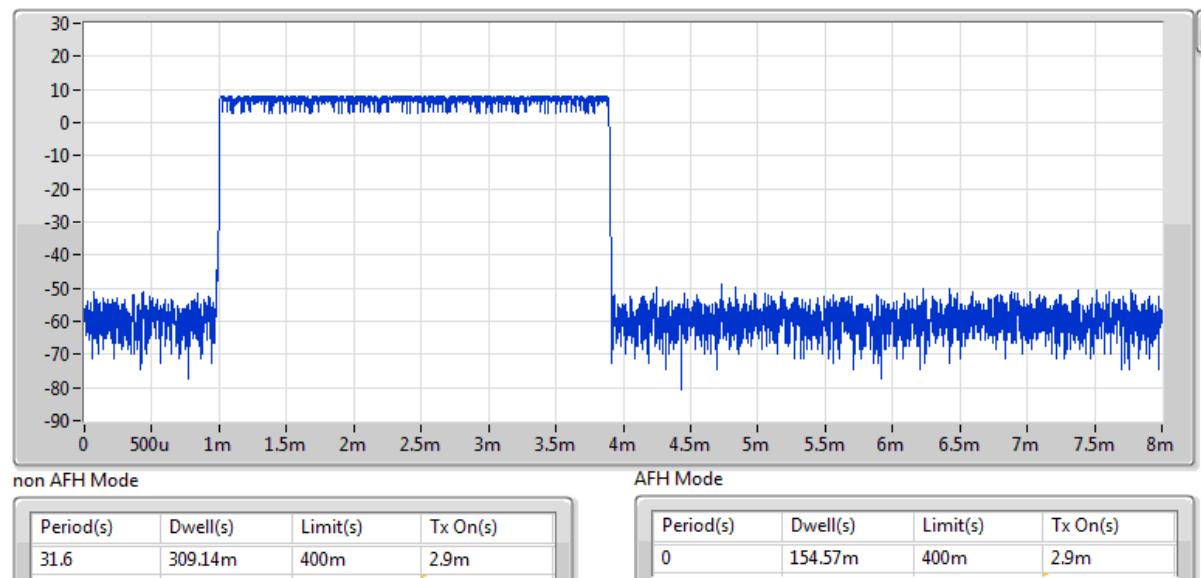
Mode	Max-Dwell (s)
2.4-2.4835GHz	-
BT-BR(1Mbps)	309.14m
BT-EDR(2Mbps)	31.2338m
BT-EDR(3Mbps)	45.1984m

**Result**

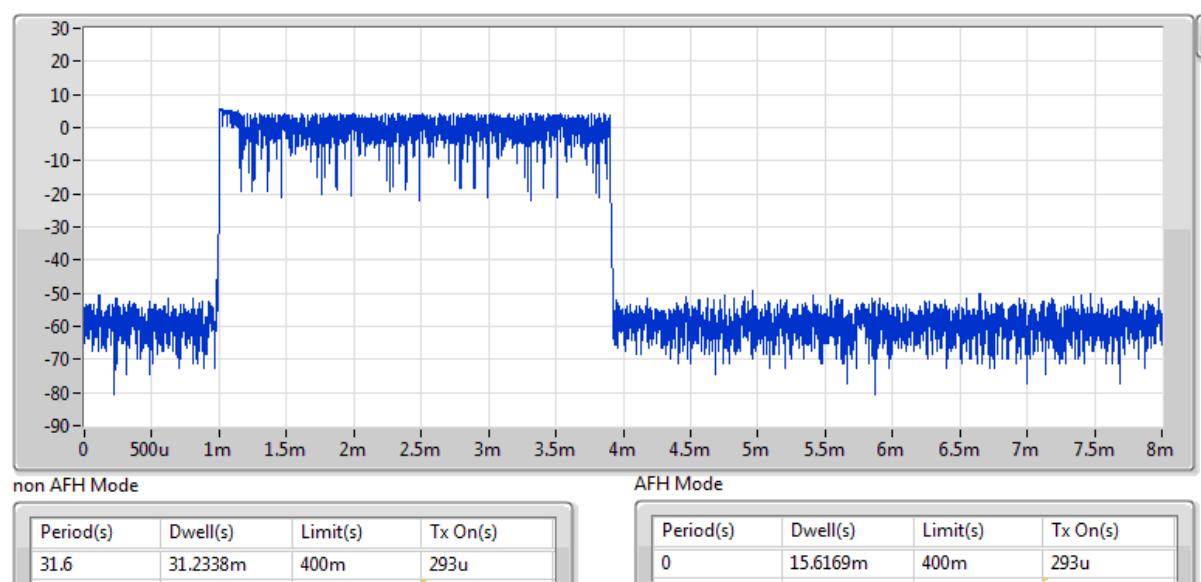
Mode	Result	Period (s)	Dwell (s)	Limit (s)	Tx On (s)
BT-BR(1Mbps)	-	-	-	-	-
2440MHz	Pass	31.6	309.14m	400m	2.9m
BT-EDR(2Mbps)	-	-	-	-	-
2440MHz	Pass	31.6	31.2338m	400m	293u
BT-EDR(3Mbps)	-	-	-	-	-
2440MHz	Pass	31.6	45.1984m	400m	424u

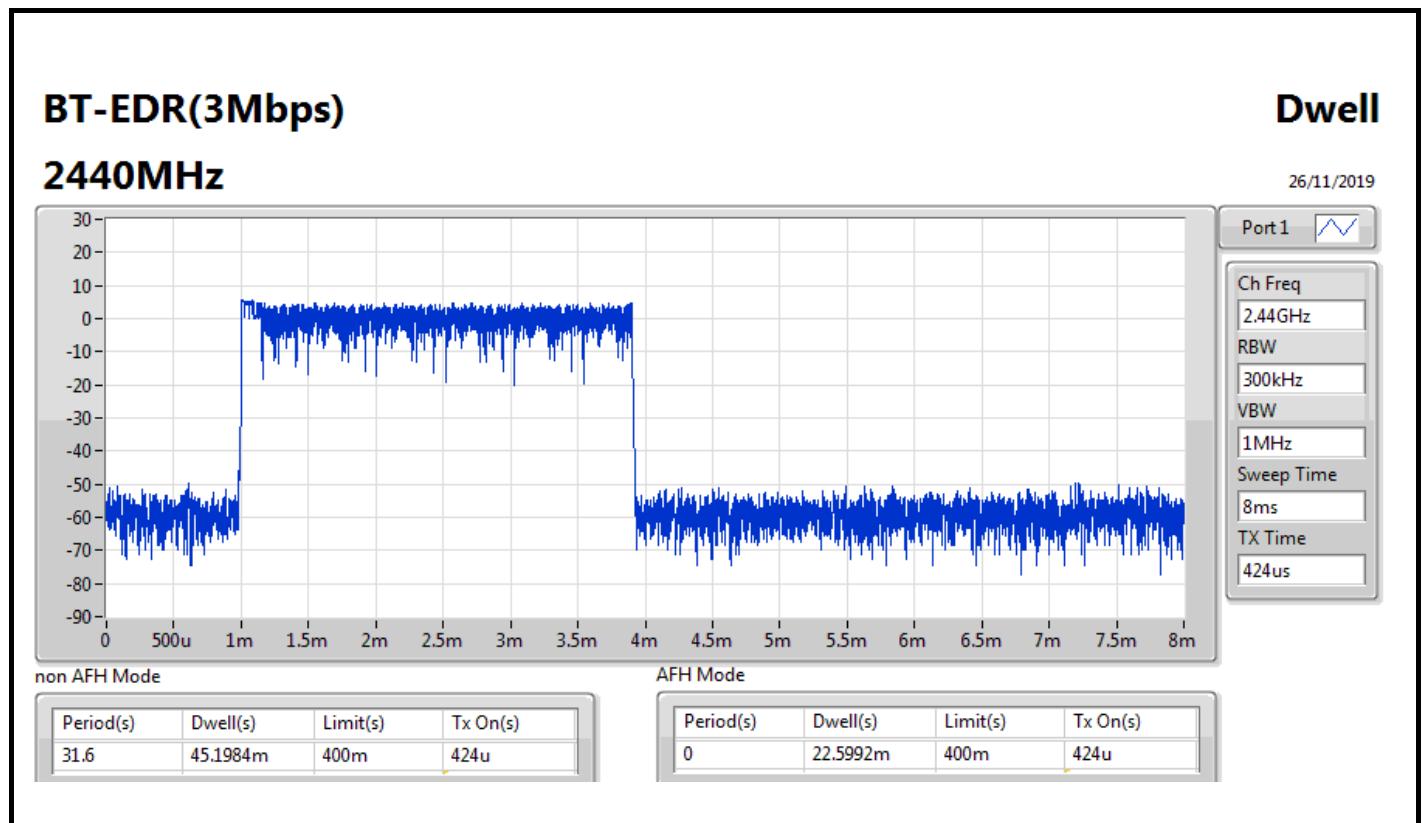
**BT-BR(1Mbps)**
**Dwell**
**2440MHz**

26/11/2019


**BT-EDR(2Mbps)**
**Dwell**
**2440MHz**

26/11/2019



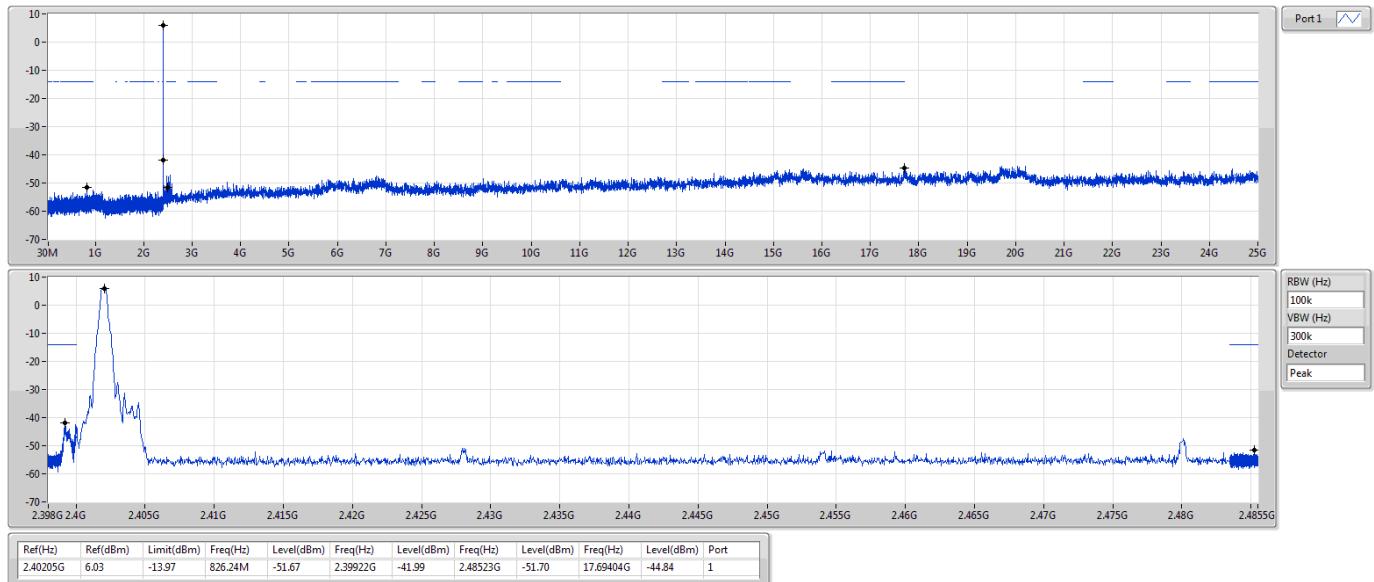
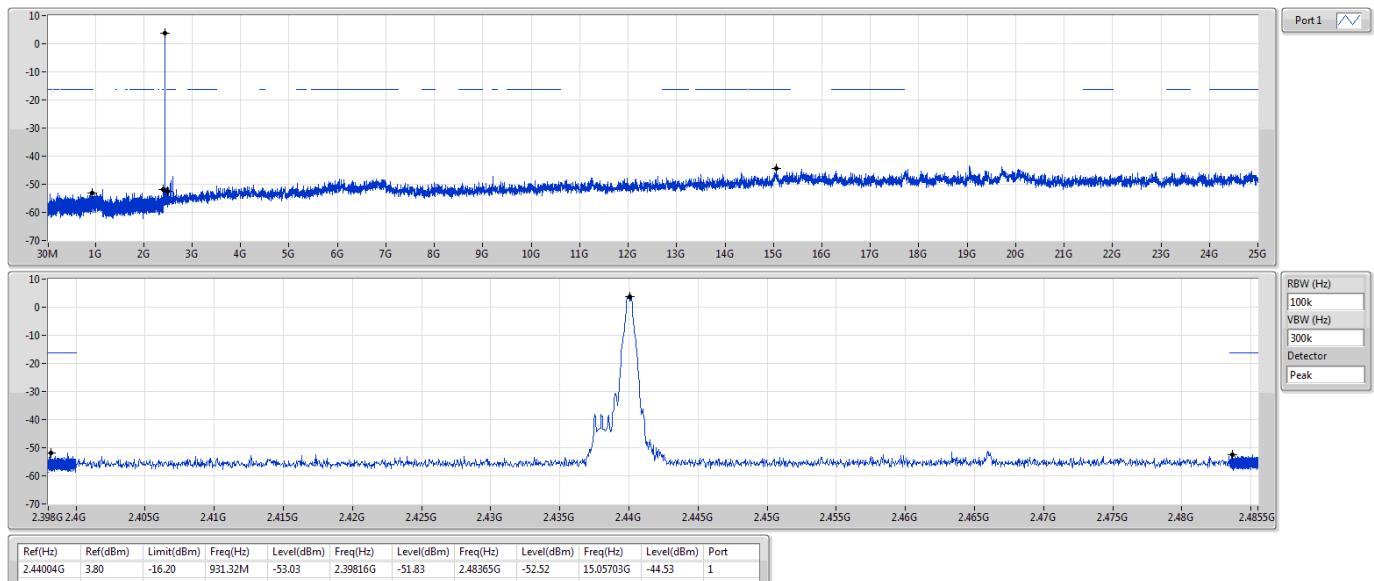


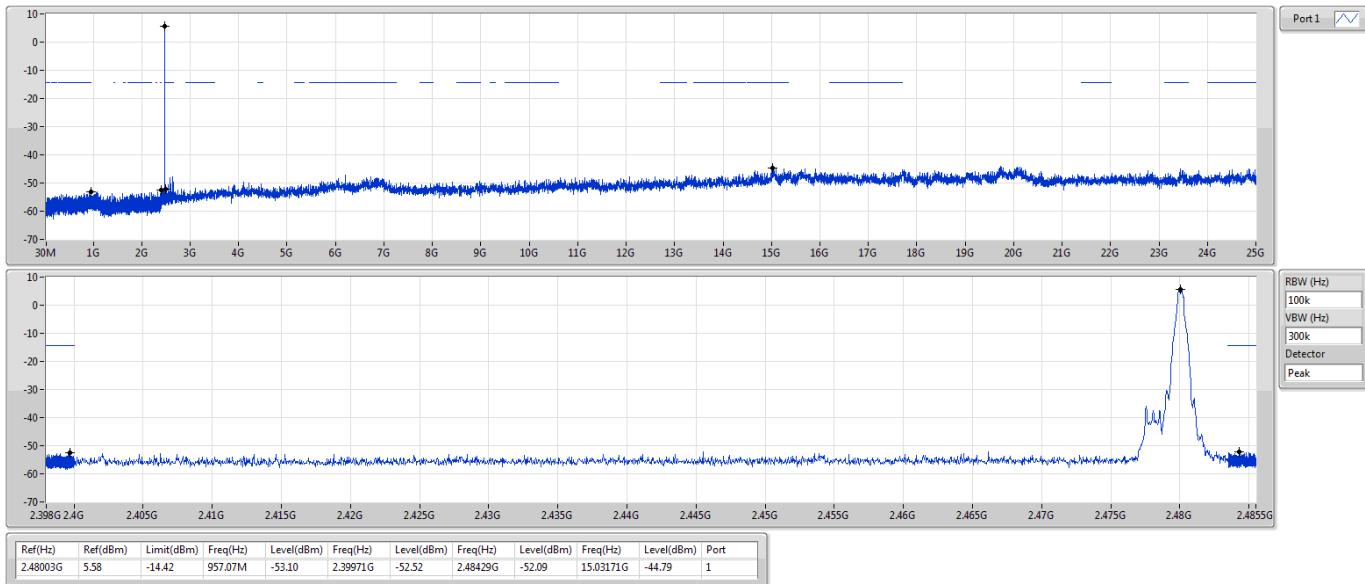
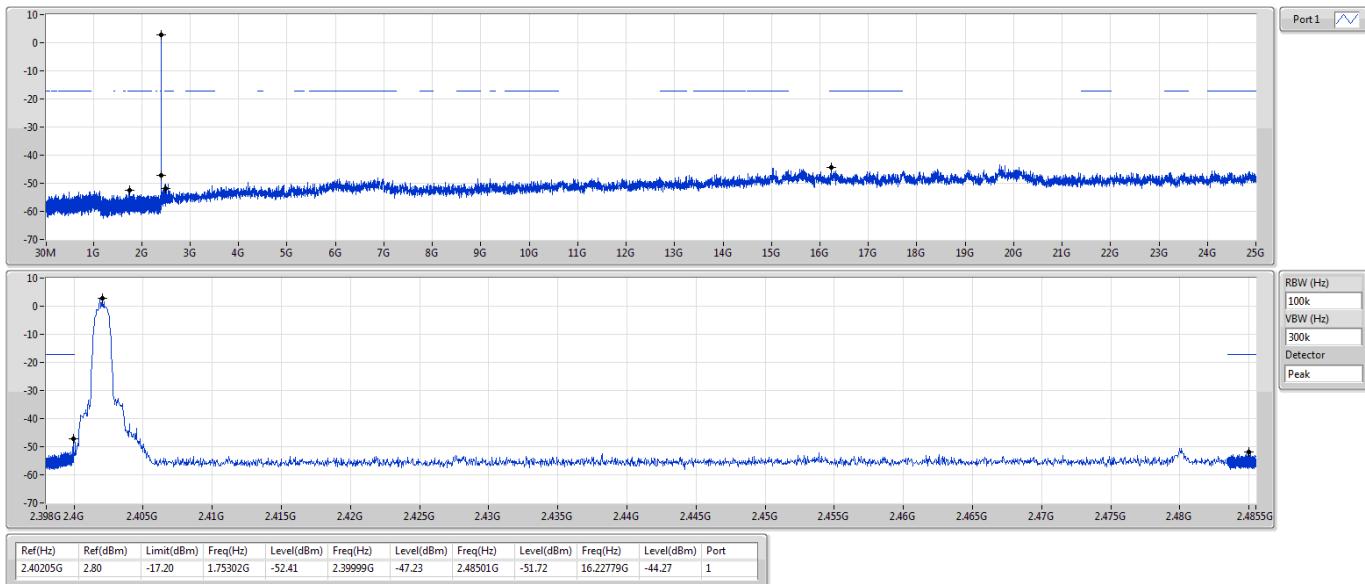
**Summary**

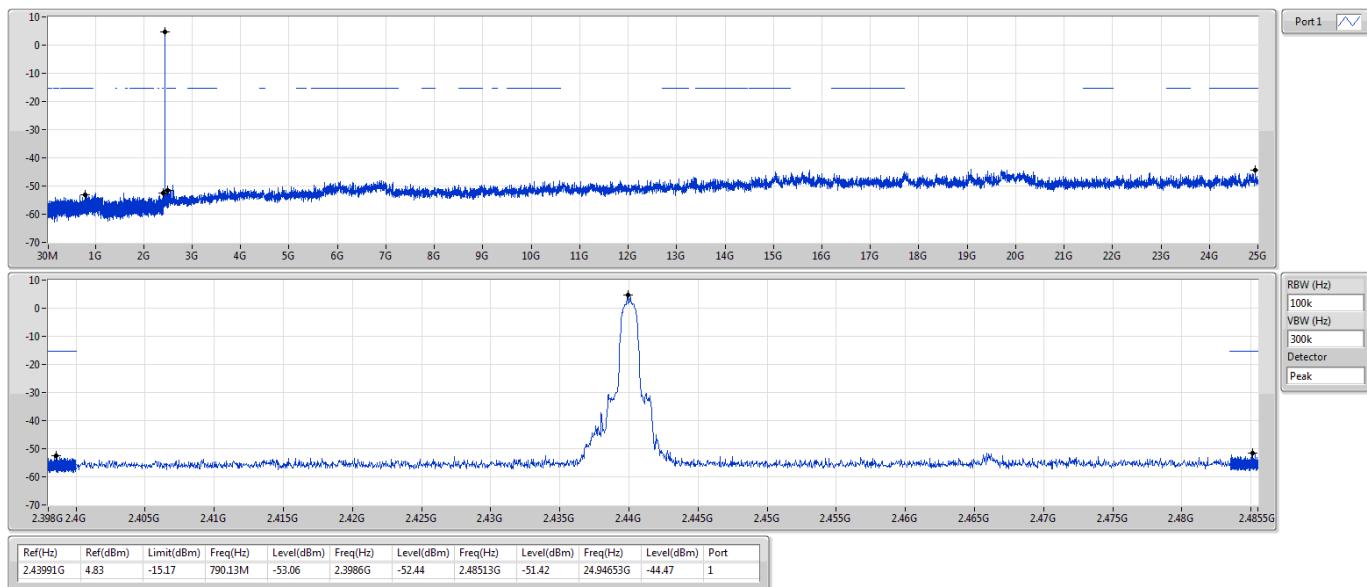
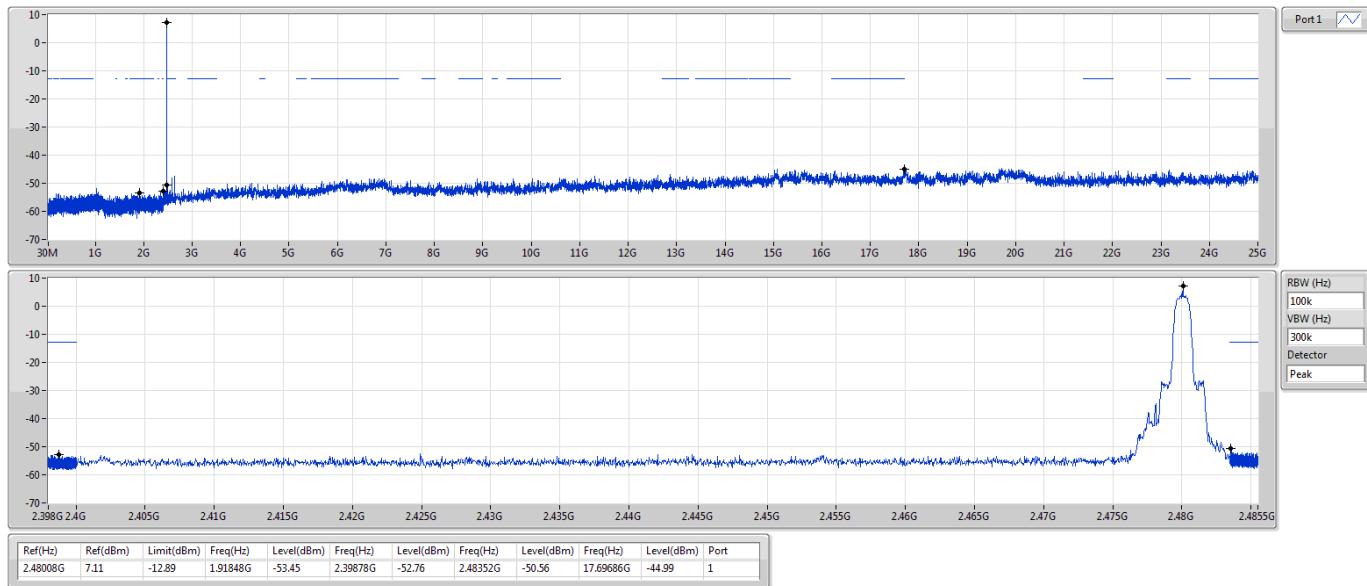
Mode	Result	Ref (Hz)	Ref (dBm)	Limit (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Port
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-	-	-
BT-BR(1Mbps)	Pass	2.40205G	6.03	-13.97	826.24M	-51.67	2.39922G	-41.99	2.48523G	-51.70	17.69404G	-44.84	1
BT-EDR(2Mbps)	Pass	2.40205G	2.80	-17.20	1.75302G	-52.41	2.39999G	-47.23	2.48501G	-51.72	16.22779G	-44.27	1
BT-EDR(3Mbps)	Pass	2.40205G	3.10	-16.90	765.56M	-52.09	2.39999G	-46.37	2.48505G	-51.37	17.69967G	-43.70	1

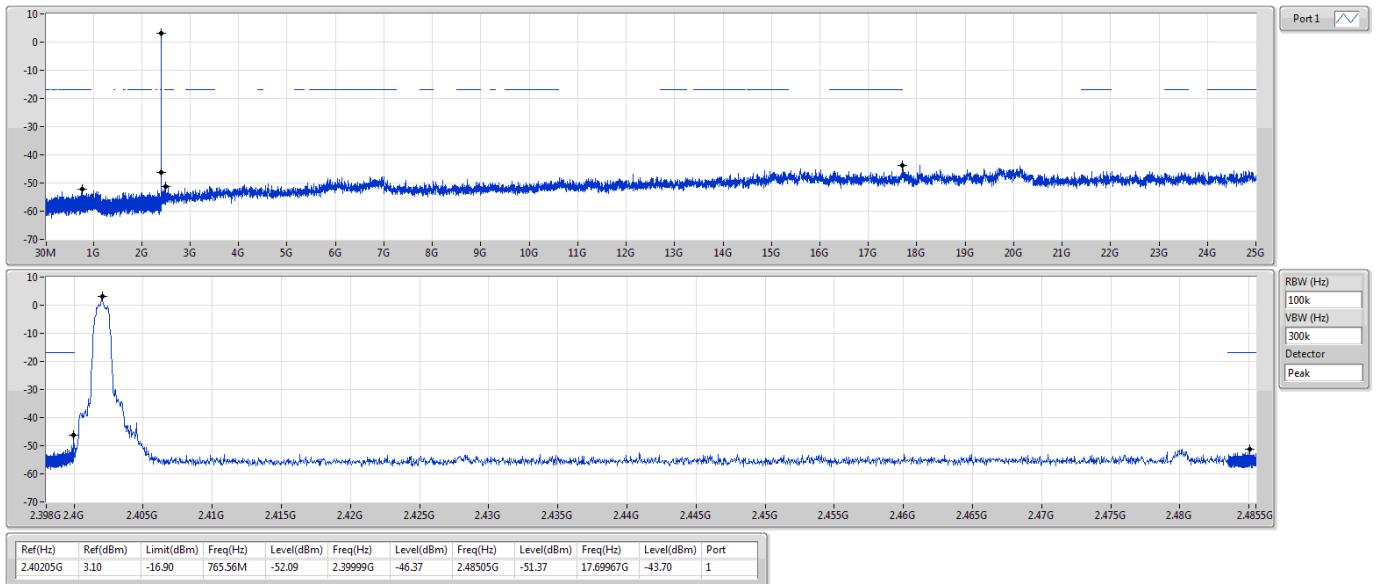
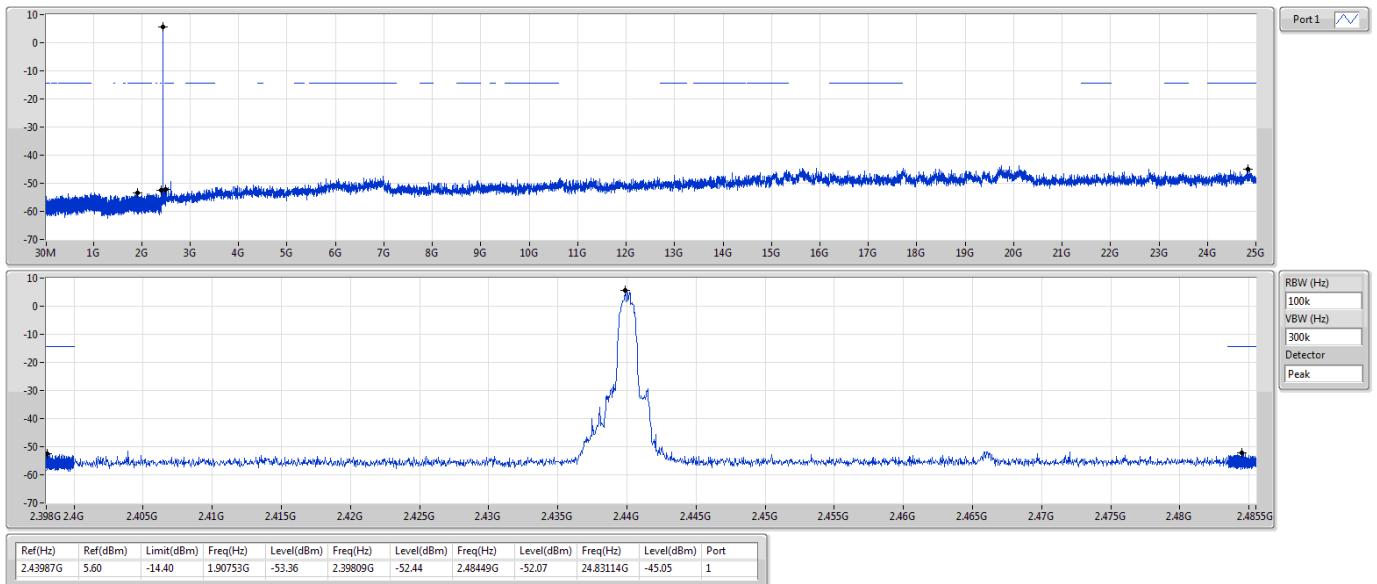
**Result**

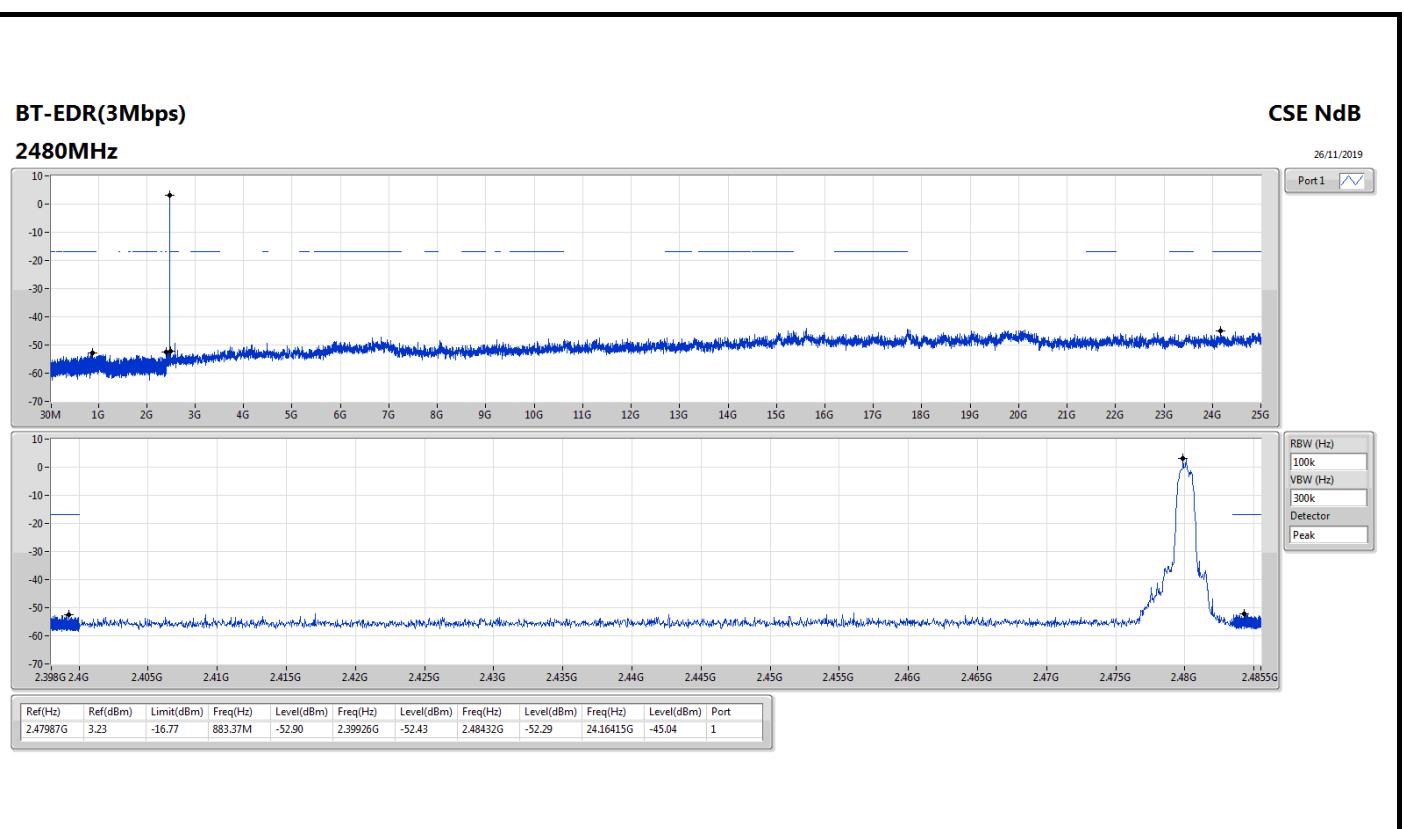
Mode	Result	Ref (Hz)	Ref (dBm)	Limit (dBm)	Freq (Hz)	Level (dBm)	Port						
BT-BR(1Mbps)	-	-	-	-	-	-	-	-	-	-	-	-	-
2402MHz	Pass	2.40205G	6.03	-13.97	826.24M	-51.67	2.39922G	-41.99	2.48523G	-51.70	17.69404G	-44.84	1
2440MHz	Pass	2.44004G	3.80	-16.20	931.32M	-53.03	2.39816G	-51.83	2.48365G	-52.52	15.05703G	-44.53	1
2480MHz	Pass	2.48003G	5.58	-14.42	957.07M	-53.10	2.39971G	-52.52	2.48429G	-52.09	15.03171G	-44.79	1
BT-EDR(2Mbps)	-	-	-	-	-	-	-	-	-	-	-	-	-
2402MHz	Pass	2.40205G	2.80	-17.20	1.75302G	-52.41	2.39999G	-47.23	2.48501G	-51.72	16.22779G	-44.27	1
2440MHz	Pass	2.43991G	4.83	-15.17	790.13M	-53.06	2.3986G	-52.44	2.48513G	-51.42	24.94653G	-44.47	1
2480MHz	Pass	2.48008G	7.11	-12.89	1.91848G	-53.45	2.39878G	-52.76	2.48352G	-50.56	17.69686G	-44.99	1
BT-EDR(3Mbps)	-	-	-	-	-	-	-	-	-	-	-	-	-
2402MHz	Pass	2.40205G	3.10	-16.90	765.56M	-52.09	2.39999G	-46.37	2.48505G	-51.37	17.69967G	-43.70	1
2440MHz	Pass	2.43987G	5.60	-14.40	1.90753G	-53.36	2.39809G	-52.44	2.48449G	-52.07	24.83114G	-45.05	1
2480MHz	Pass	2.47987G	3.23	-16.77	883.37M	-52.90	2.39926G	-52.43	2.48432G	-52.29	24.16415G	-45.04	1

**BT-BR(1Mbps)**
**2402MHz**

**BT-BR(1Mbps)**
**2440MHz**


**BT-BR(1Mbps)**
**2480MHz**

**BT-EDR(2Mbps)**
**2402MHz**


**BT-EDR(2Mbps)**
**2440MHz**

**BT-EDR(2Mbps)**
**2480MHz**


**BT-EDR(3Mbps)**
**2402MHz**

**BT-EDR(3Mbps)**
**2440MHz**




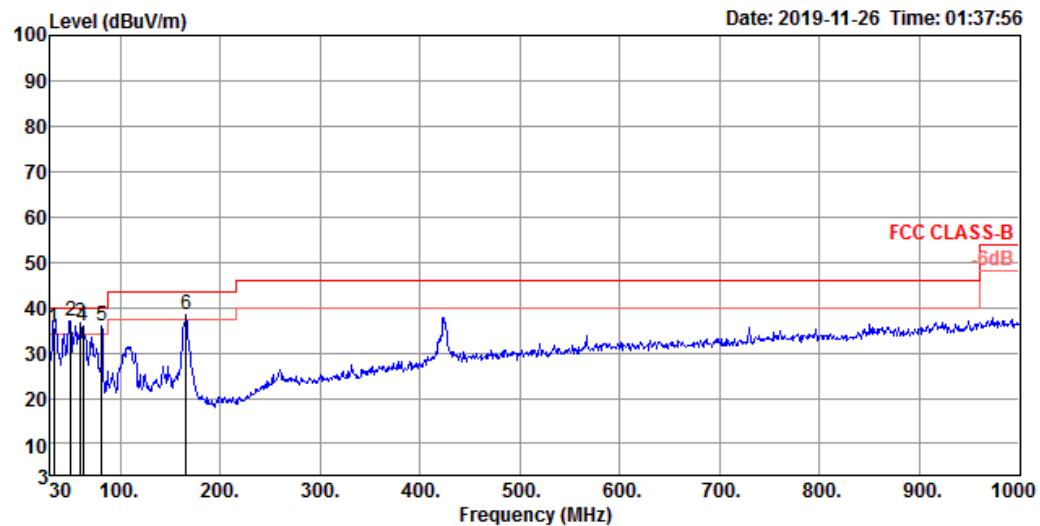


## Radiated Emission below 1GHz Result

Appendix G.1

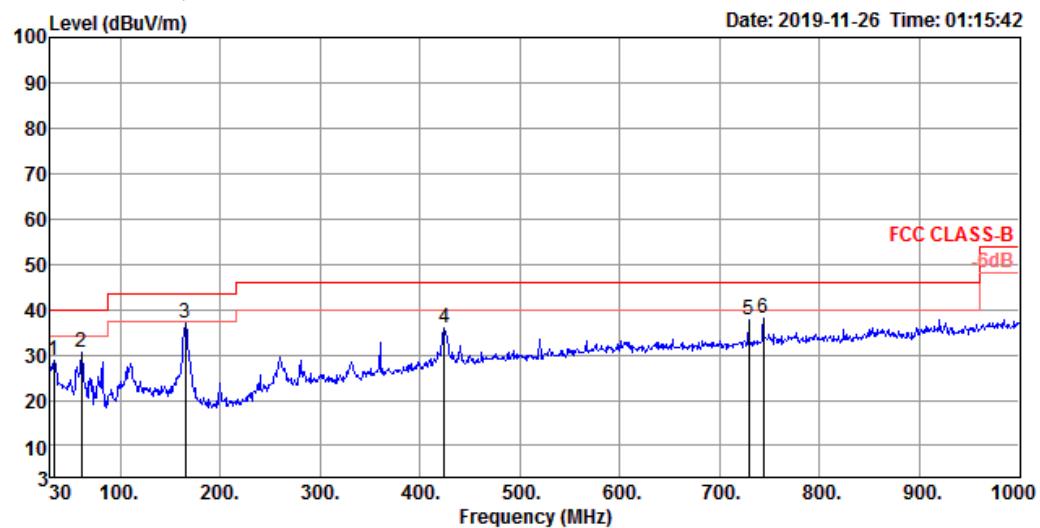
Test Mode	Mode 4	Frequency Range	30 MHz to 1,000 MHz
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Vertical 30 MHz to 1,000 MHz



Freq	Level	Limit		Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
		Line	dB									
1	33.88	35.68	40.00	-4.32	45.10	1.08	21.94	32.44	110	108	QP	VERTICAL
2	50.37	36.96	40.00	-3.04	54.53	1.32	13.83	32.72	300	304	Peak	VERTICAL
3	60.07	36.66	40.00	-3.34	55.58	1.44	12.16	32.52	100	11	Peak	VERTICAL
4	62.98	35.76	40.00	-4.24	54.75	1.48	12.00	32.47	100	174	Peak	VERTICAL
5	81.41	36.04	40.00	-3.96	53.98	1.68	12.87	32.49	100	91	Peak	VERTICAL
6	165.80	38.32	43.50	-5.18	52.69	2.38	15.70	32.45	100	36	Peak	VERTICAL

## Horizontal 30 MHz to 1,000 MHz



Freq	Level	Limit	Over	Read	Cable			A/Pos	T/Pos	Remark	Pol/Phase
					Line	Limit	Level				
MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	33.88	28.85	40.00	-11.15	38.27	1.08	21.94	32.44	100	360	Peak HORIZONTAL
2	61.04	30.65	40.00	-9.35	49.59	1.45	12.11	32.50	200	93	Peak HORIZONTAL
3	164.83	37.06	43.50	-6.44	51.40	2.38	15.74	32.46	200	93	Peak HORIZONTAL
4	424.79	36.10	46.00	-9.90	41.92	4.03	22.41	32.26	100	106	Peak HORIZONTAL
5	729.37	37.75	46.00	-8.25	39.47	5.39	25.09	32.20	150	255	Peak HORIZONTAL
6	743.92	38.14	46.00	-7.86	39.48	5.45	25.31	32.10	150	224	Peak HORIZONTAL

**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	4.96007G	53.99	54.00	-0.01	5.17	3	Vertical	159	2.51	-

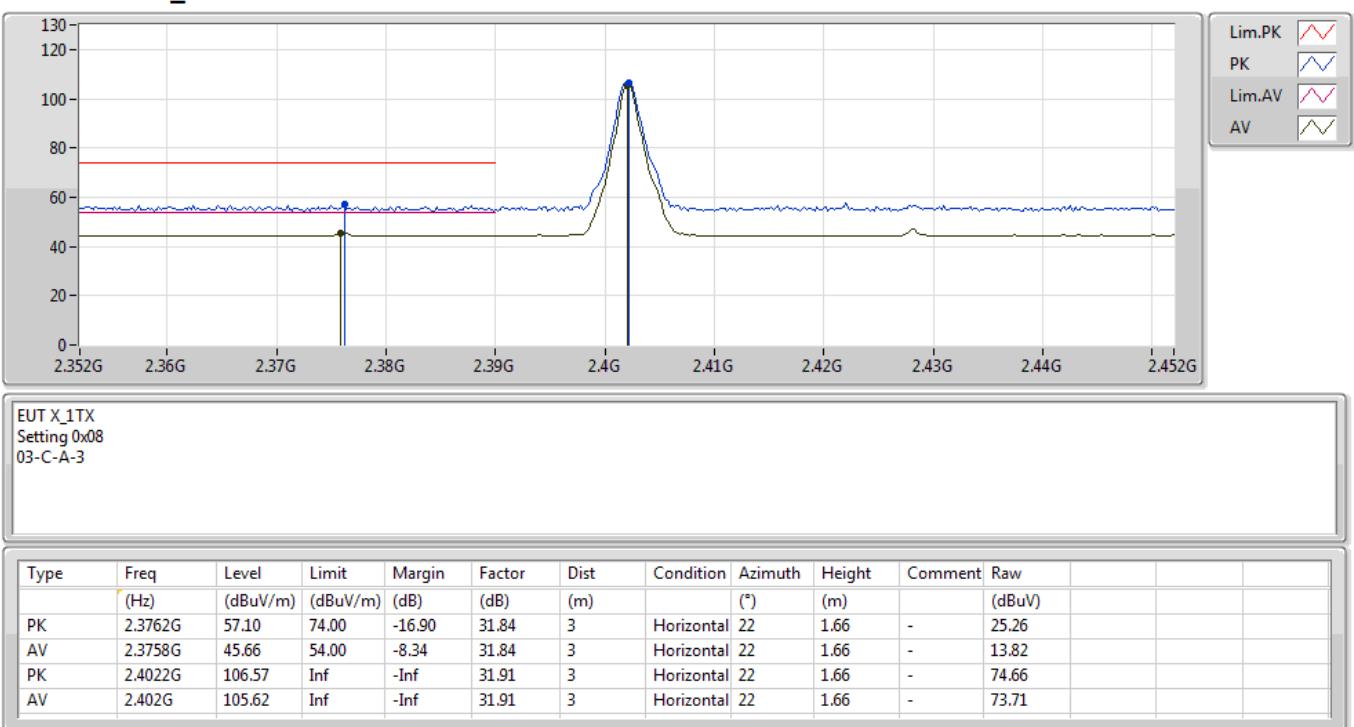
**BT-BR(1Mbps)**
**2402MHz\_TX**

26/12/2019



**BT-BR(1Mbps)**
**2402MHz\_TX**

26/12/2019

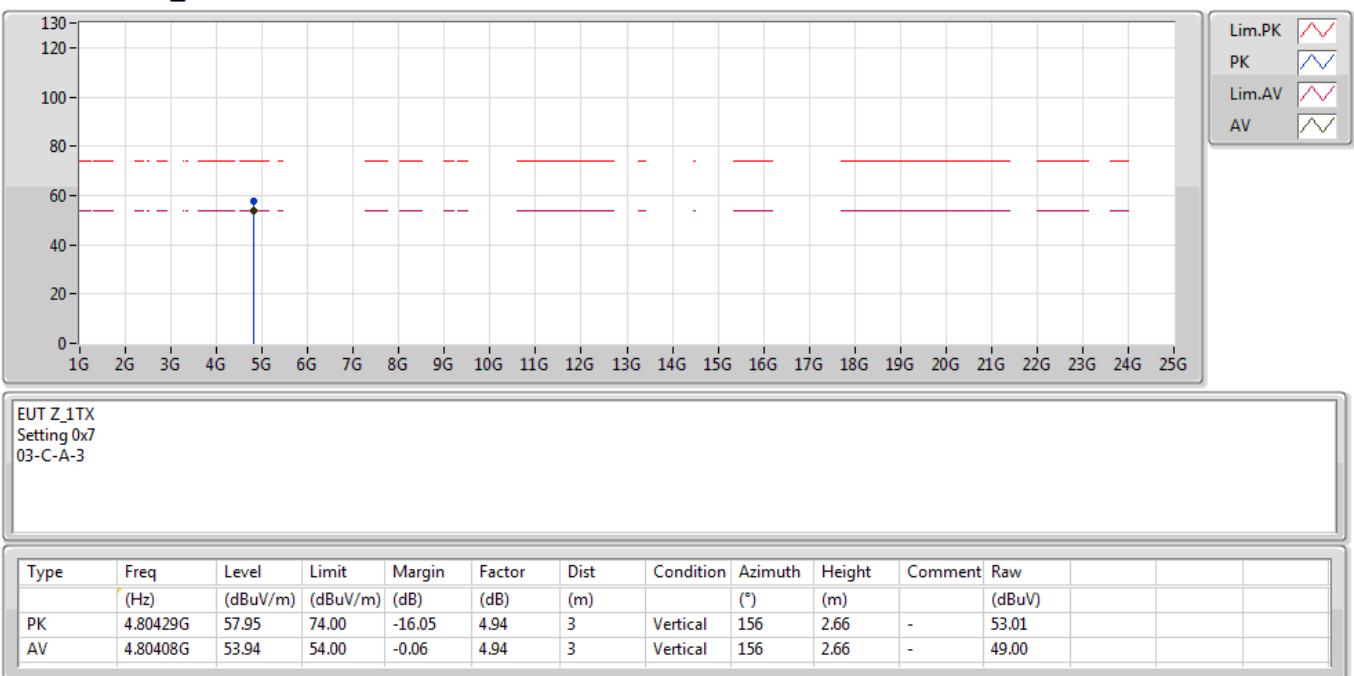




## BT-BR(1Mbps)

## 2402MHz\_TX

26/12/2019

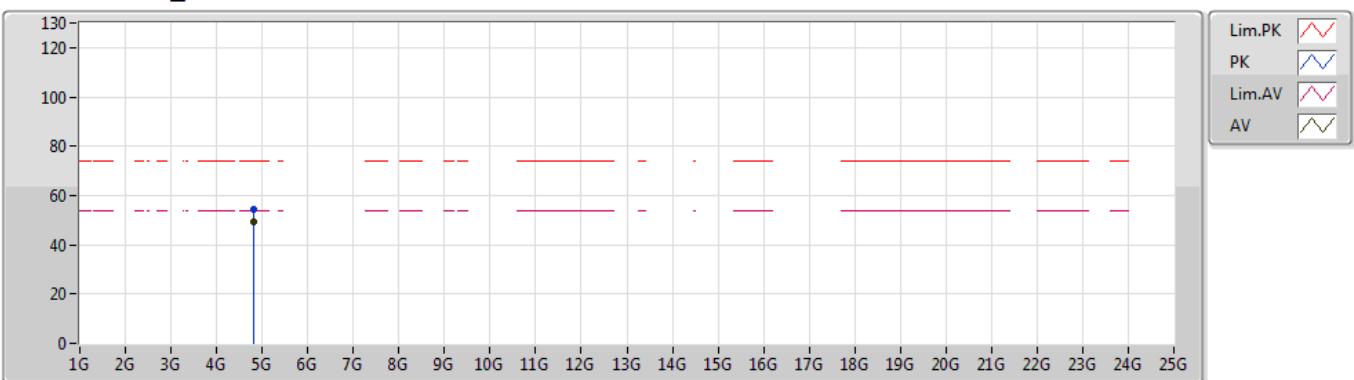




## BT-BR(1Mbps)

## 2402MHz\_TX

26/12/2019



EUT Z\_1TX  
Setting 0x7  
03-C-A-3

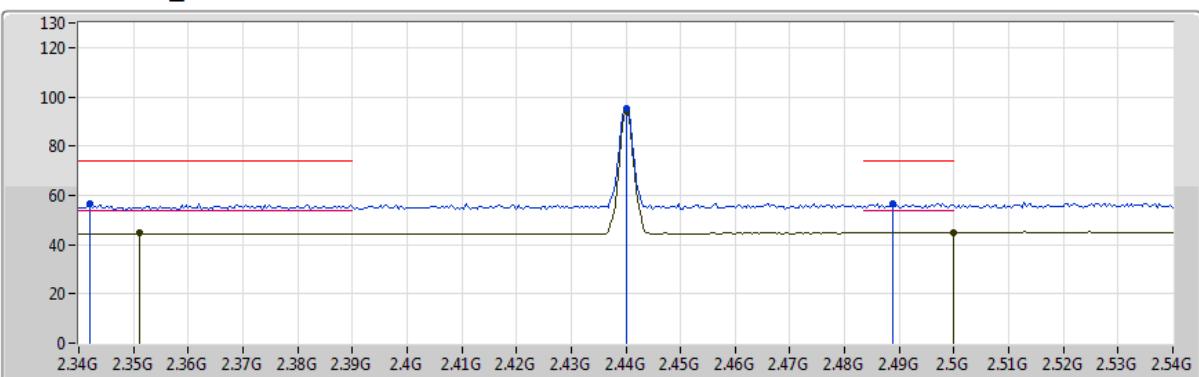
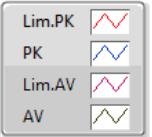
Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)				
PK	4.80423G	54.63	74.00	-19.37	4.94	3	Horizontal	237	2.57	-	49.69				
AV	4.80408G	49.40	54.00	-4.60	4.94	3	Horizontal	237	2.57	-	44.46				



## BT-BR(1Mbps)

## 2440MHz\_TX

26/12/2019

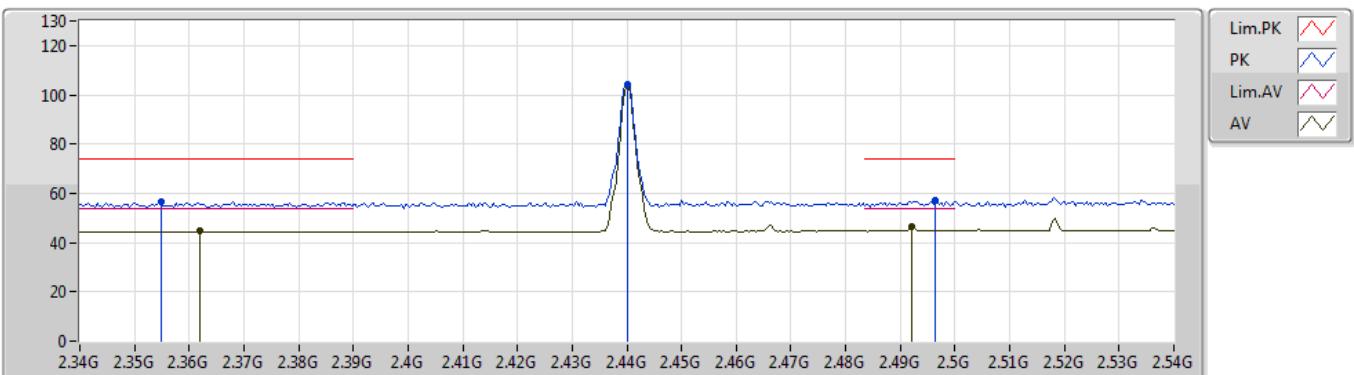


EUT X\_1TX  
Setting 0x07  
03-C-A-3

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)				
PK	2.342G	56.74	74.00	-17.26	31.75	3	Vertical	0	1.29	-	24.99				
AV	2.3512G	44.63	54.00	-9.37	31.78	3	Vertical	0	1.29	-	12.85				
PK	2.44G	95.09	Inf	-Inf	32.06	3	Vertical	0	1.29	-	63.03				
AV	2.44G	93.94	Inf	-Inf	32.06	3	Vertical	0	1.29	-	61.88				
PK	2.4888G	56.66	74.00	-17.34	32.26	3	Vertical	0	1.29	-	24.40				
AV	2.5G	44.91	54.00	-9.09	32.30	3	Vertical	0	1.29	-	12.61				

**BT-BR(1Mbps)**
**2440MHz\_TX**

26/12/2019



EUT X\_1TX  
Setting 0x07  
03-C-A-3

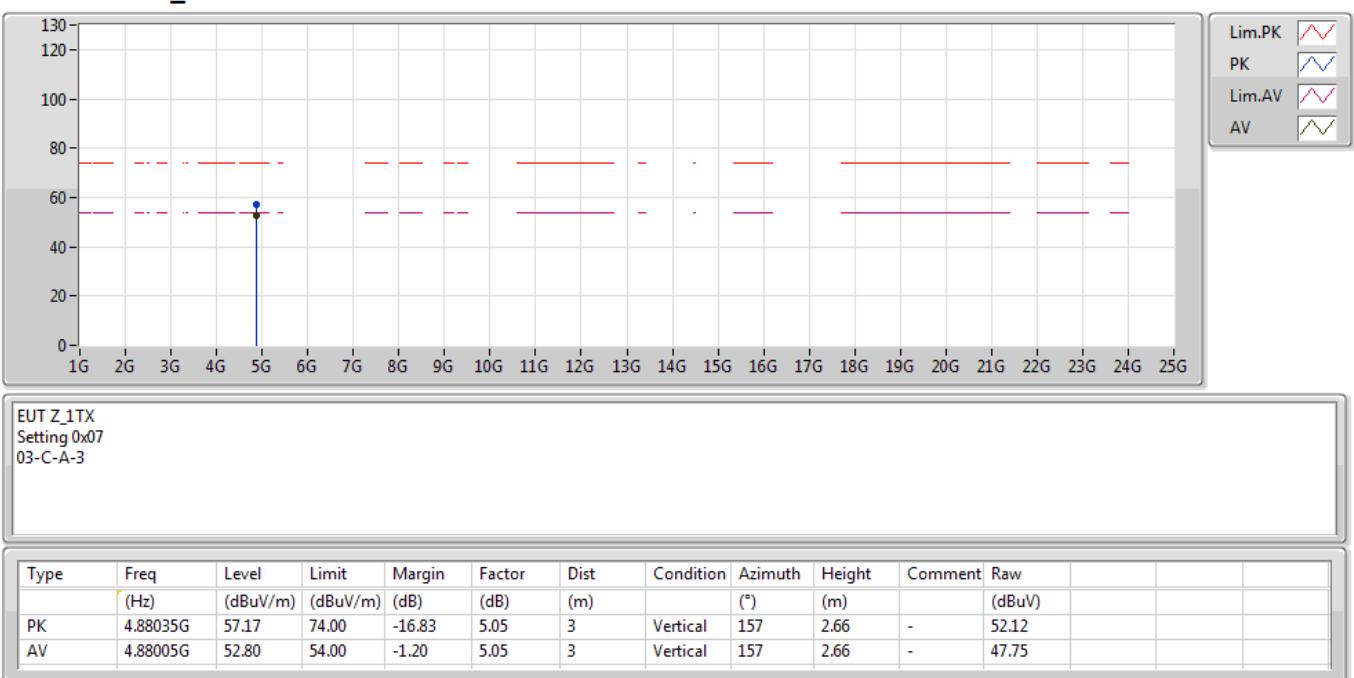
Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)
PK	2.3548G	56.61	74.00	-17.39	31.79	3	Horizontal	10	1.17	-	24.82
AV	2.362G	44.61	54.00	-9.39	31.80	3	Horizontal	10	1.17	-	12.81
PK	2.44G	104.47	Inf	-Inf	32.06	3	Horizontal	10	1.17	-	72.41
AV	2.44G	103.54	Inf	-Inf	32.06	3	Horizontal	10	1.17	-	71.48
PK	2.4964G	56.98	74.00	-17.02	32.29	3	Horizontal	10	1.17	-	24.69
AV	2.492G	46.55	54.00	-7.45	32.27	3	Horizontal	10	1.17	-	14.28



## BT-BR(1Mbps)

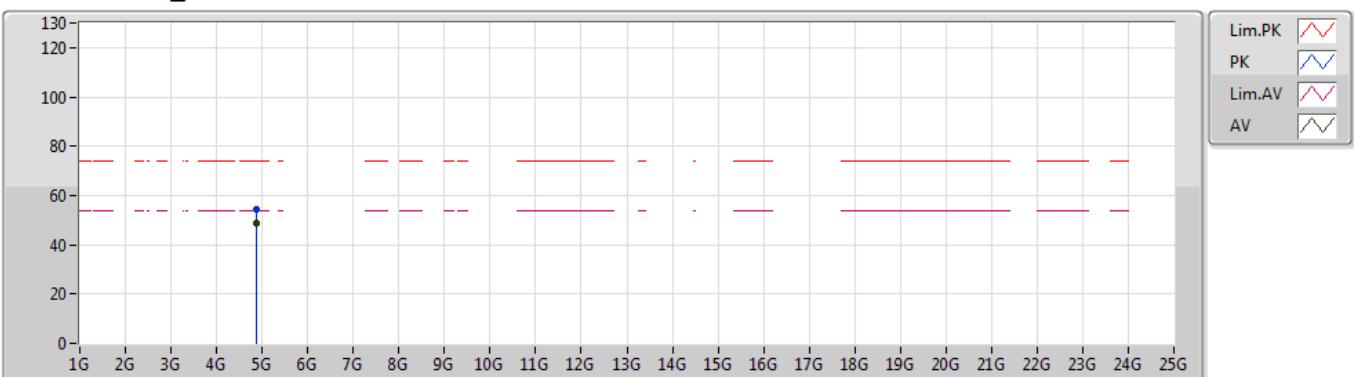
## 2440MHz\_TX

26/12/2019



**BT-BR(1Mbps)**
**2440MHz\_TX**

26/12/2019


 EUT Z\_1TX  
 Setting 0x07  
 03-C-A-3

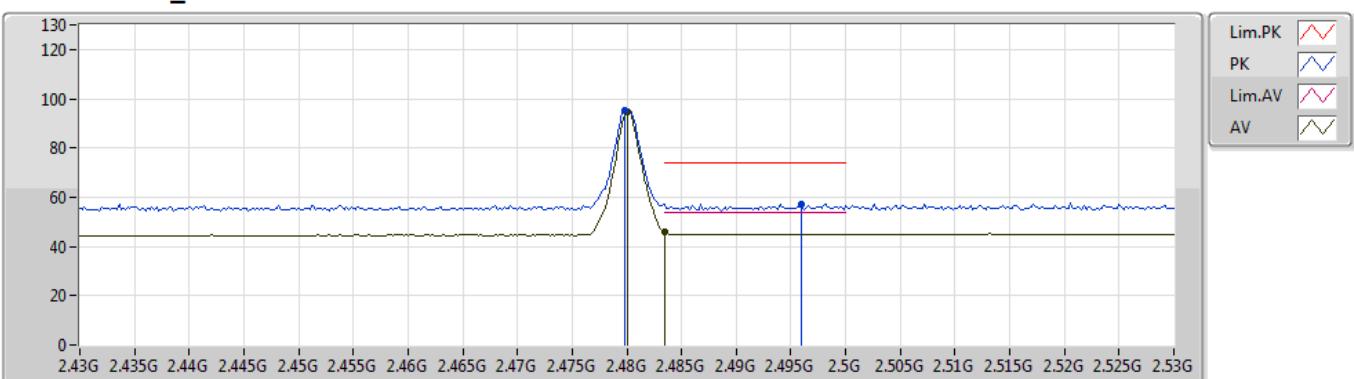
Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)			
PK	4.8804G	54.34	74.00	-19.66	5.05	3	Horizontal	234	2.43	-	49.29			
AV	4.88006G	48.68	54.00	-5.32	5.05	3	Horizontal	234	2.43	-	43.63			



## BT-BR(1Mbps)

## 2480MHz\_TX

26/12/2019



EUT X\_1TX  
Setting 0x04  
03-C-A-3

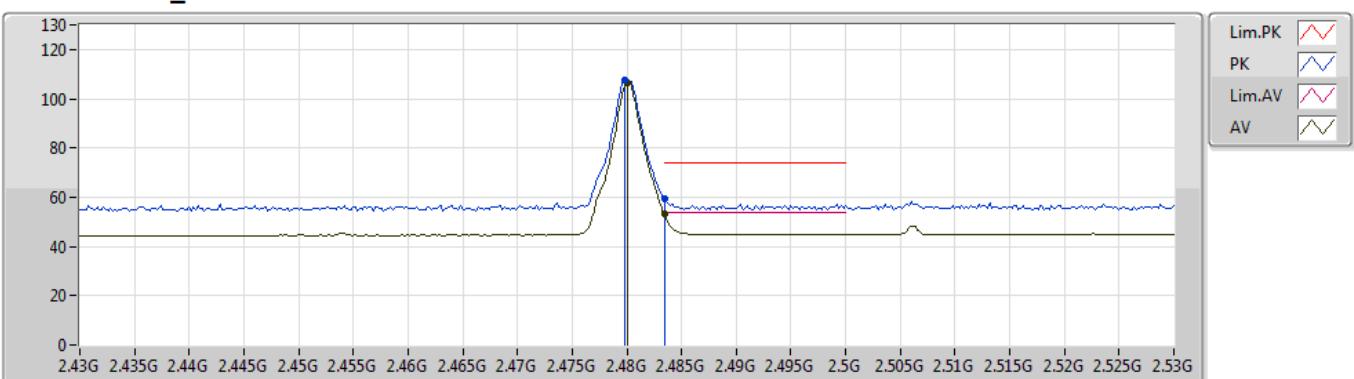
Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)				
PK	2.4798G	95.51	Inf	-Inf	32.22	3	Vertical	284	1.50	-	63.29				
AV	2.48G	94.51	Inf	-Inf	32.22	3	Vertical	284	1.50	-	62.29				
PK	2.496G	57.36	74.00	-16.64	32.29	3	Vertical	284	1.50	-	25.07				
AV	2.4835G	45.73	54.00	-8.27	32.23	3	Vertical	284	1.50	-	13.50				



## BT-BR(1Mbps)

## 2480MHz\_TX

26/12/2019



EUT X\_1TX  
Setting 0x04  
03-C-A-3

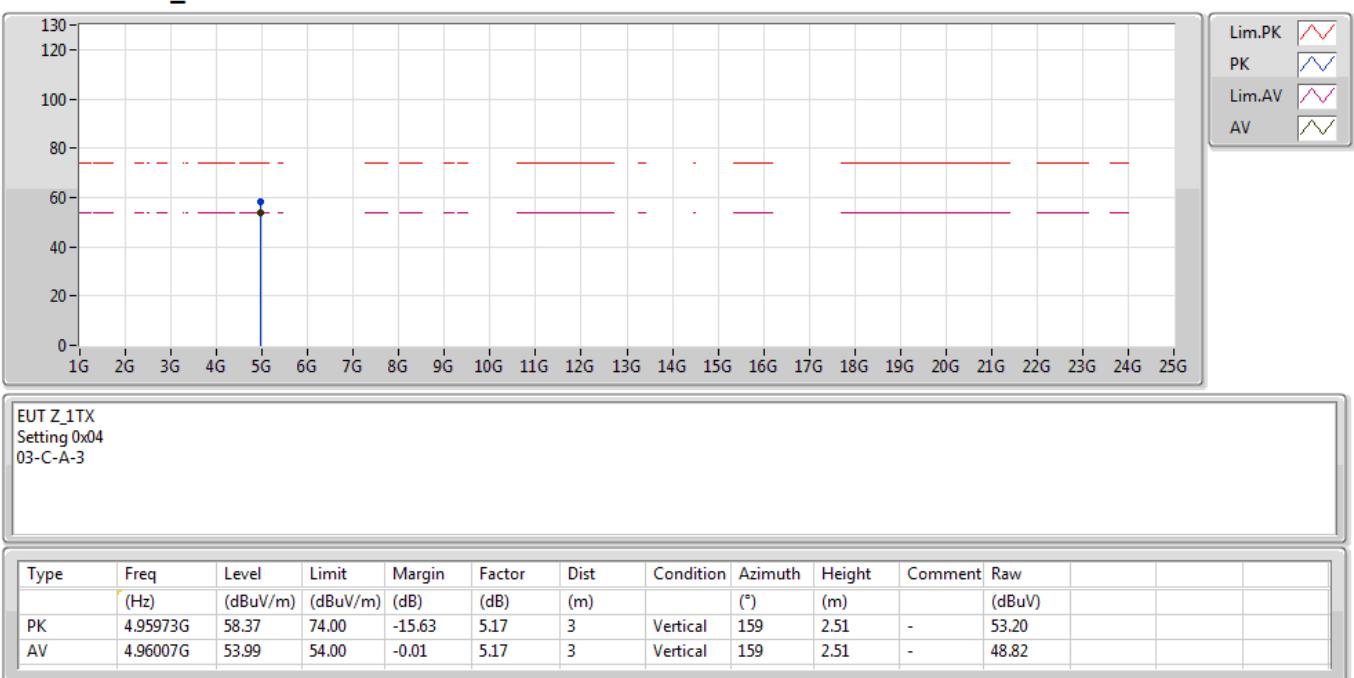
Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)				
PK	2.4798G	107.37	Inf	-Inf	32.22	3	Horizontal	9	1.01	-	75.15				
AV	2.48G	106.41	Inf	-Inf	32.22	3	Horizontal	9	1.01	-	74.19				
PK	2.4835G	59.28	74.00	-14.72	32.23	3	Horizontal	9	1.01	-	27.05				
AV	2.4835G	53.28	54.00	-0.72	32.23	3	Horizontal	9	1.01	-	21.05				



## BT-BR(1Mbps)

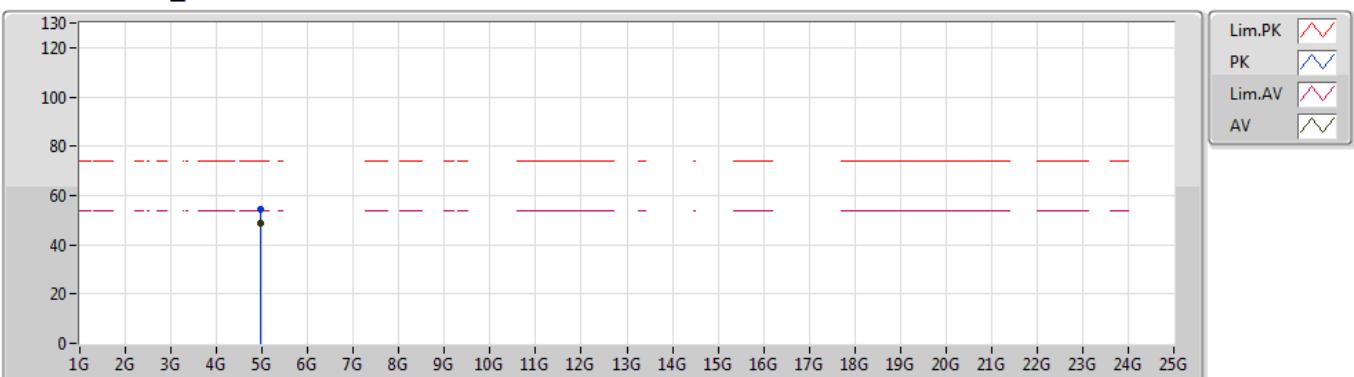
## 2480MHz\_TX

26/12/2019



**BT-BR(1Mbps)**
**2480MHz\_TX**

26/12/2019

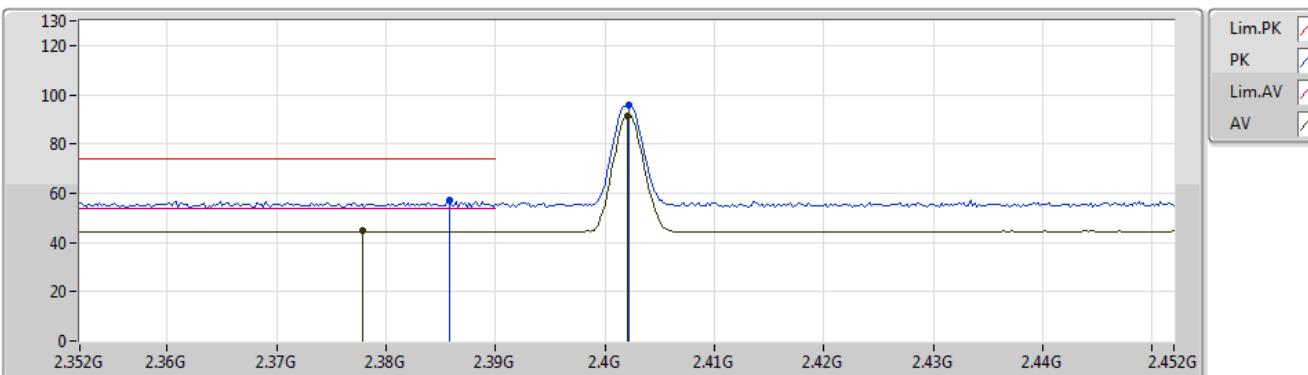


EUT Z\_1TX  
Setting 0x04  
03-C-A-3

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)			
PK	4.95968G	54.22	74.00	-19.78	5.17	3	Horizontal	240	2.55	-	49.05			
AV	4.96009G	48.67	54.00	-5.33	5.17	3	Horizontal	240	2.55	-	43.50			

**BT-EDR(3Mbps)**
**2402MHz\_TX**

26/12/2019

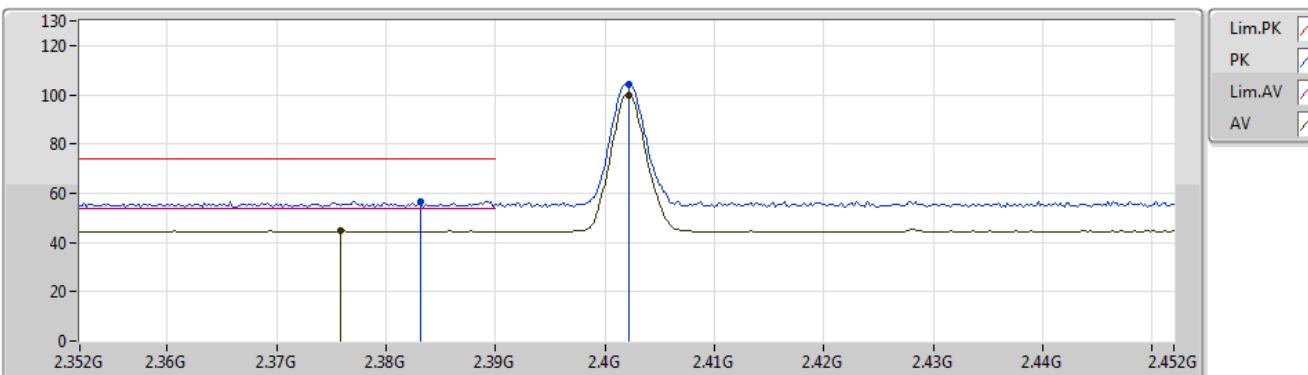


EUT X\_1TX  
Setting 0x08  
03-C-C-4

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)			
PK	2.3858G	57.05	74.00	-16.95	31.86	3	Vertical	1	1.46	-	25.19			
AV	2.3778G	44.58	54.00	-9.42	31.85	3	Vertical	1	1.46	-	12.73			
PK	2.4022G	95.59	Inf	-Inf	31.91	3	Vertical	1	1.46	-	63.68			
AV	2.402G	91.42	Inf	-Inf	31.91	3	Vertical	1	1.46	-	59.51			

**BT-EDR(3Mbps)**
**2402MHz\_TX**

26/12/2019



EUT X\_1TX  
Setting 0x08  
03-C-C-4

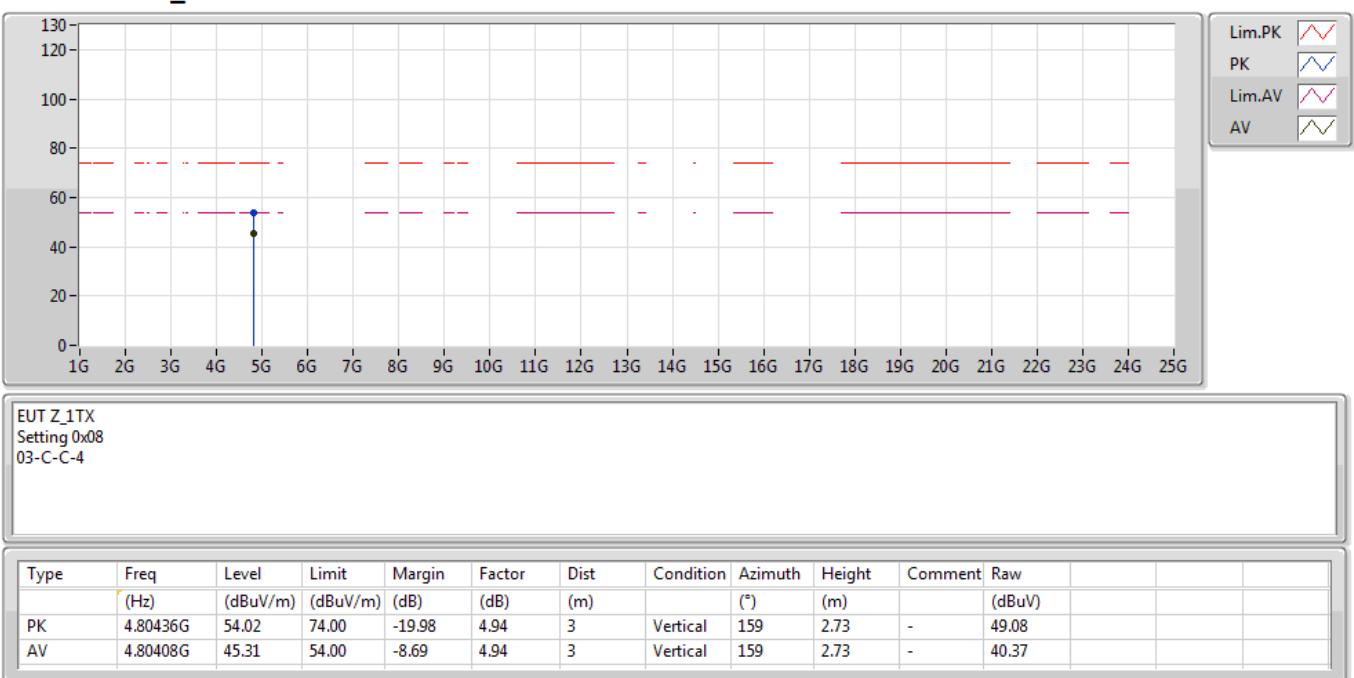
Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)			
PK	2.3832G	56.57	74.00	-17.43	31.86	3	Horizontal	32	2.12	-	24.71			
AV	2.3758G	44.75	54.00	-9.25	31.84	3	Horizontal	32	2.12	-	12.91			
PK	2.4022G	104.21	Inf	-Inf	31.91	3	Horizontal	32	2.12	-	72.30			
AV	2.4022G	99.97	Inf	-Inf	31.91	3	Horizontal	32	2.12	-	68.06			



## BT-EDR(3Mbps)

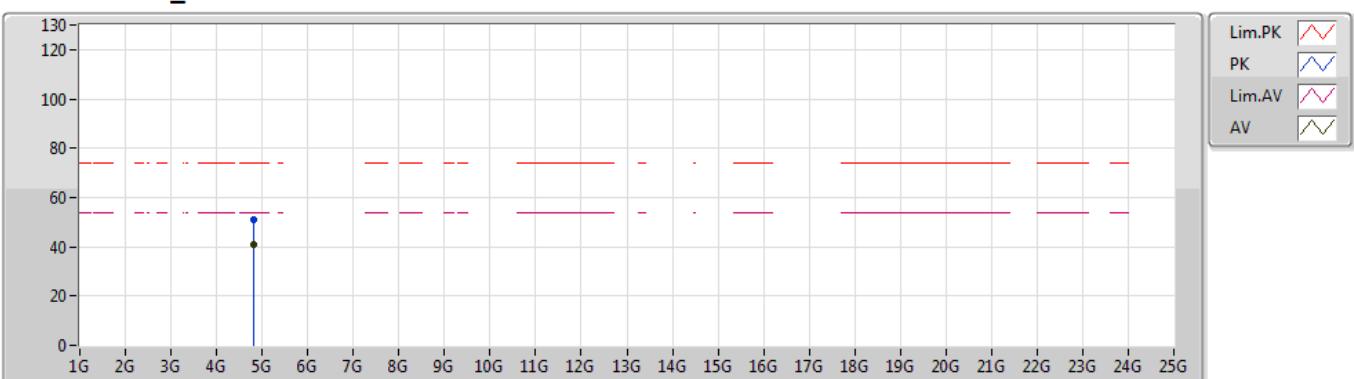
## 2402MHz\_TX

26/12/2019



**BT-EDR(3Mbps)**
**2402MHz\_TX**

26/12/2019

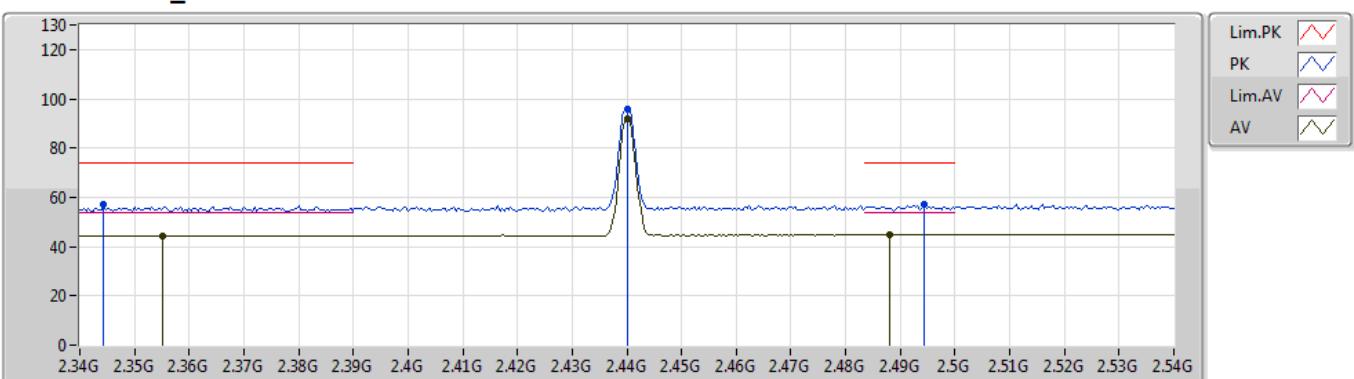


EUT Z\_1TX  
Setting 0x08  
03-C-C-4

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)			
PK	4.80426G	51.14	74.00	-22.86	4.94	3	Horizontal	241	2.52	-	46.20			
AV	4.80404G	40.91	54.00	-13.09	4.94	3	Horizontal	241	2.52	-	35.97			

**BT-EDR(3Mbps)**
**2440MHz\_TX**

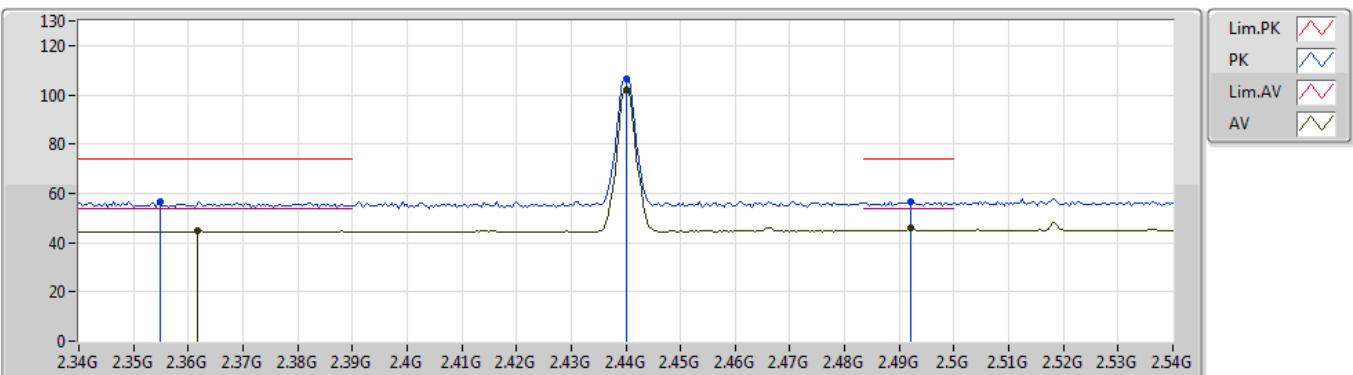
26/12/2019


 EUT X\_1TX  
 Setting 0x08  
 03-C-C-4

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)			
PK	2.3444G	57.07	74.00	-16.93	31.76	3	Vertical	356	1.60	-	25.31			
AV	2.3552G	44.47	54.00	-9.53	31.79	3	Vertical	356	1.60	-	12.68			
PK	2.44G	95.98	Inf	-Inf	32.06	3	Vertical	356	1.60	-	63.92			
AV	2.44G	91.86	Inf	-Inf	32.06	3	Vertical	356	1.60	-	59.80			
PK	2.4944G	57.37	74.00	-16.63	32.27	3	Vertical	356	1.60	-	25.10			
AV	2.488G	45.02	54.00	-8.98	32.25	3	Vertical	356	1.60	-	12.77			

**BT-EDR(3Mbps)**
**2440MHz\_TX**

26/12/2019


 EUT X\_1TX  
 Setting 0x08  
 03-C-C-4

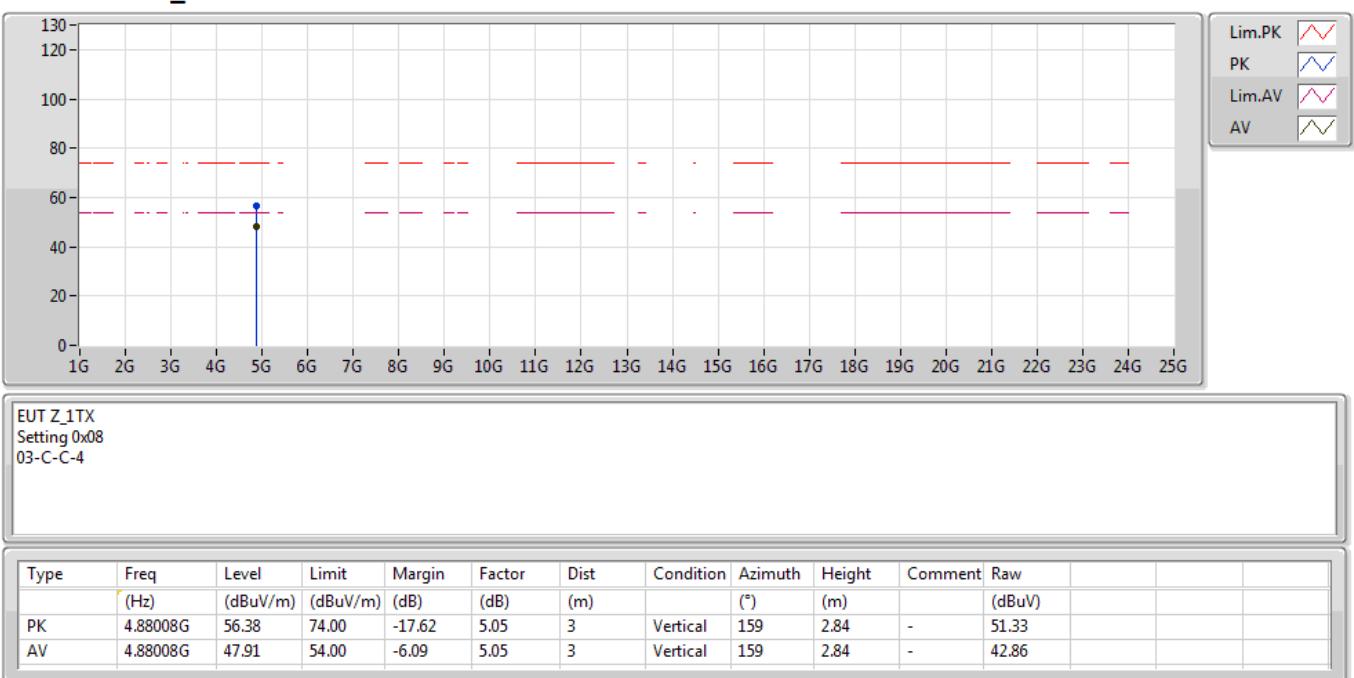
Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)			
PK	2.3548G	56.66	74.00	-17.34	31.79	3	Horizontal	20	2.54	-	24.87			
AV	2.3616G	45.04	54.00	-8.96	31.80	3	Horizontal	20	2.54	-	13.24			
PK	2.44G	106.29	Inf	-Inf	32.06	3	Horizontal	20	2.54	-	74.23			
AV	2.44G	102.22	Inf	-Inf	32.06	3	Horizontal	20	2.54	-	70.16			
PK	2.492G	56.81	74.00	-17.19	32.27	3	Horizontal	20	2.54	-	24.54			
AV	2.492G	45.91	54.00	-8.09	32.27	3	Horizontal	20	2.54	-	13.64			



## BT-EDR(3Mbps)

## 2440MHz\_TX

26/12/2019

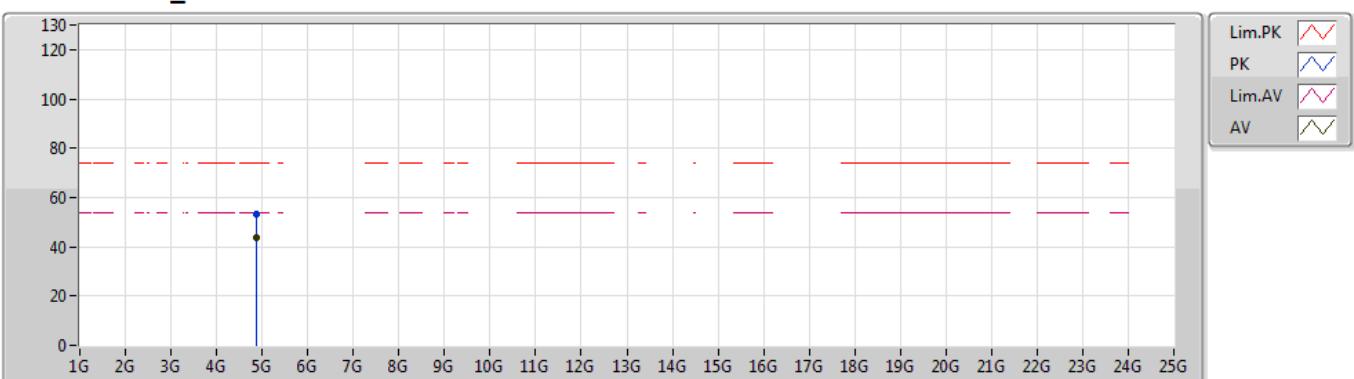




## BT-EDR(3Mbps)

## 2440MHz\_TX

26/12/2019

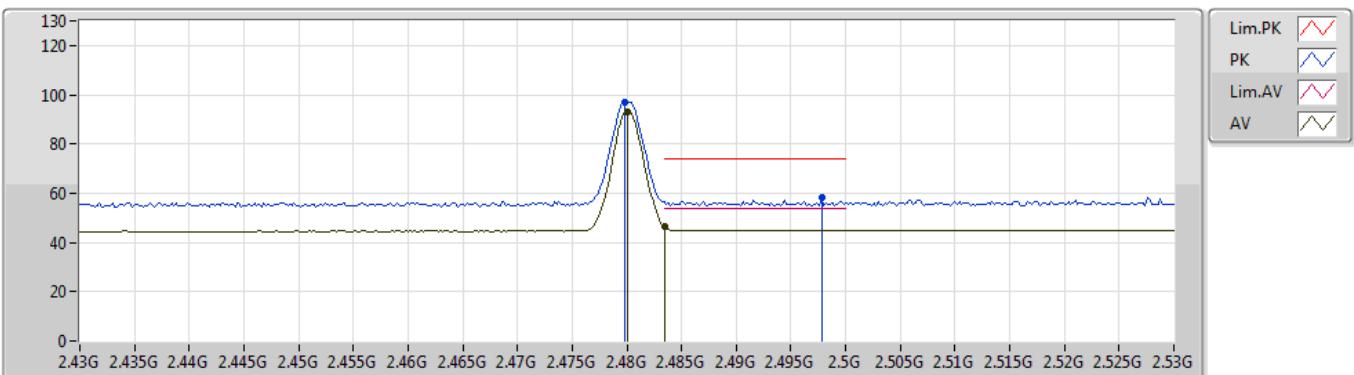


EUT Z\_1TX  
Setting 0x08  
03-C-C-4

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)				
PK	4.88008G	53.04	74.00	-20.96	5.05	3	Horizontal	238	2.41	-	47.99				
AV	4.87998G	43.54	54.00	-10.46	5.05	3	Horizontal	238	2.41	-	38.49				

**BT-EDR(3Mbps)**
**2480MHz\_TX**

26/12/2019



EUT X\_1TX  
Setting 0x07  
03-C-C-4

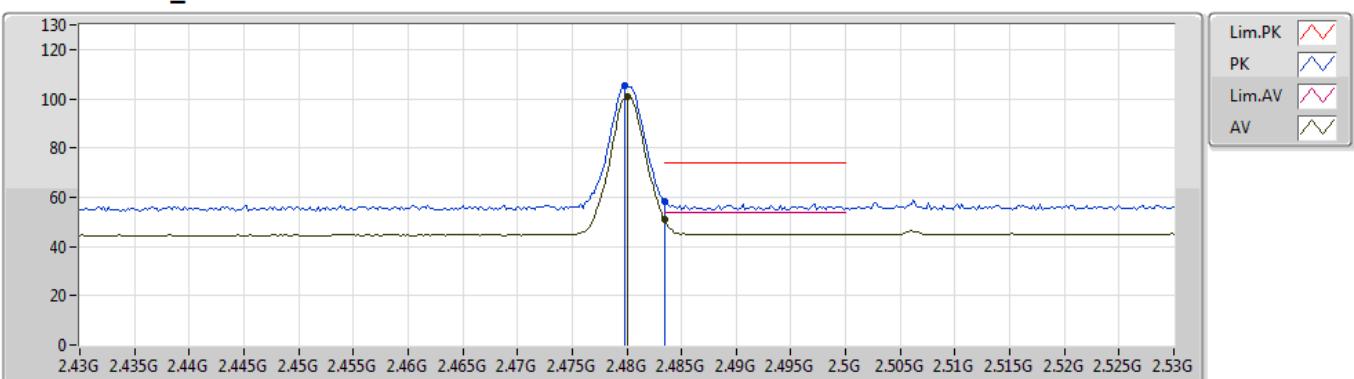
Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)			
PK	2.4798G	97.13	Inf	-Inf	32.22	3	Vertical	285	1.51	-	64.91			
AV	2.48G	93.09	Inf	-Inf	32.22	3	Vertical	285	1.51	-	60.87			
PK	2.4978G	58.19	74.00	-15.81	32.29	3	Vertical	285	1.51	-	25.90			
AV	2.4835G	46.25	54.00	-7.75	32.23	3	Vertical	285	1.51	-	14.02			



## BT-EDR(3Mbps)

## 2480MHz\_TX

26/12/2019

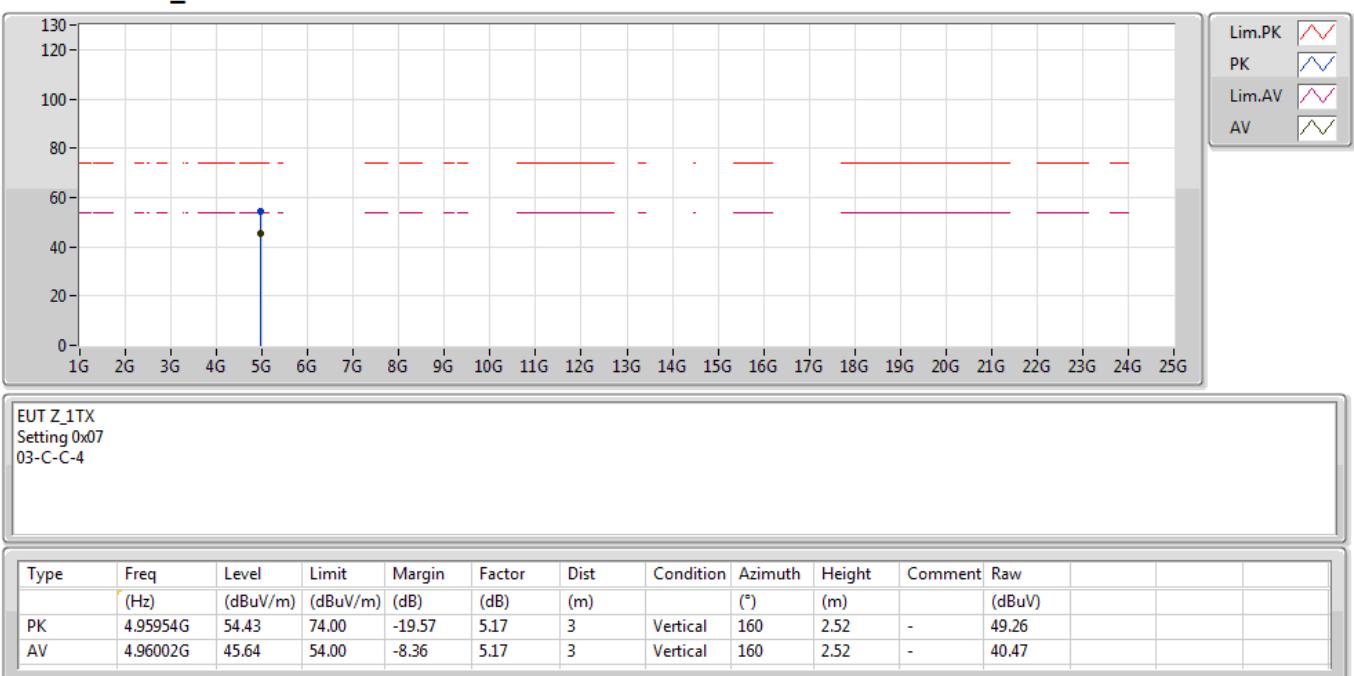


EUT X\_1TX  
Setting 0x07  
03-C-C-4

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)				
PK	2.4798G	105.17	Inf	-Inf	32.22	3	Horizontal	10	1.01	-	72.95				
AV	2.48G	100.90	Inf	-Inf	32.22	3	Horizontal	10	1.01	-	68.68				
PK	2.4835G	58.14	74.00	-15.86	32.23	3	Horizontal	10	1.01	-	25.91				
AV	2.4835G	51.02	54.00	-2.98	32.23	3	Horizontal	10	1.01	-	18.79				

**BT-EDR(3Mbps)**
**2480MHz\_TX**

26/12/2019



**BT-EDR(3Mbps)**
**2480MHz\_TX**

26/12/2019

