

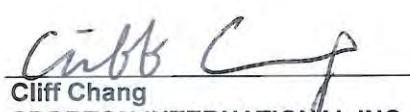


# FCC Test Report

**Equipment** : Wireless LAN Network Module  
**Brand Name** : Arcadyan  
**Model No.** : WN9711BTAAC-YA  
**FCC ID** : RAXWN9711  
**Standard** : 47 CFR FCC Part 15.247  
**Frequency** : 2400 MHz – 2483.5 MHz  
**Function** :  Point-to-multipoint;  Point-to-point  
**Applicant** : Arcadyan Technology Corporation  
No.8, Sec.2, Guangfu Rd., Hsinchu, 30071 Taiwan  
**Manufacturer** : Arcadyan Technology Corporation  
No.8, Sec.2, Guangfu Rd., Hsinchu, 30071 Taiwan

The product sample received on Jun. 05, 2017 and completely tested on Dec. 13, 2017. We, SPORTON, would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.10-2013 and shown compliance with the applicable technical standards.

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

  
Cliff Chang  
SPORTON INTERNATIONAL INC.





## Table of Contents

<b>1</b>	<b>GENERAL DESCRIPTION .....</b>	<b>5</b>
1.1	Information.....	5
1.2	Testing Applied Standards .....	9
1.3	Testing Location Information .....	9
1.4	Measurement Uncertainty .....	9
<b>2</b>	<b>TEST CONFIGURATION OF EUT .....</b>	<b>10</b>
2.1	The Worst Case Measurement Configuration.....	10
2.2	EUT Operation during Test .....	11
2.3	Accessories .....	12
2.4	Support Equipment.....	12
2.5	Test Setup Diagram .....	13
<b>3</b>	<b>TRANSMITTER TEST RESULT .....</b>	<b>16</b>
3.1	AC Power-line Conducted Emissions .....	16
3.2	Emissions in Restricted Frequency Bands.....	17
<b>4</b>	<b>TEST EQUIPMENT AND CALIBRATION DATA .....</b>	<b>21</b>

**APPENDIX A. PHOTOGRAPHS OF EUT****APPENDIX B. TEST RESULTS OF AC POWER-LINE CONDUCTED EMISSIONS****APPENDIX C. TEST RESULTS OF EMISSIONS IN RESTRICTED FREQUENCY BANDS****APPENDIX D. TEST RESULTS OF RADIATED EMISSION CO-LOCATION****APPENDIX E. TEST PHOTOS**



## Summary of Test Result

Conformance Test Specifications				
Report Clause	Ref. Std. Clause	Description	Limit	Result
1.1.2	15.203	Antenna Requirement	FCC 15.203	Complied
3.1	15.207	AC Power-line Conducted Emissions	FCC 15.207	Complied
3.2	15.247(d)	Emissions in Restricted Frequency Bands	Restricted Bands: FCC 15.209	Complied



## Revision History



## 1 General Description

### 1.1 Information

#### 1.1.1 RF General Information

Frequency Range (MHz)	Bluetooth Mode	Ch. Frequency (MHz)	Channel Number
2400-2483.5	LE	2402-2480	0-39 [40]

Band	Mode	BWch (MHz)	Nant
2.4-2.4835GHz	BT-LE(1Mbps)	1	1TX

Note:

- Bluetooth LE uses a GFSK (1Mbps) modulation for DSSS.
- 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.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	
						2.4GHz	5GHz
1	1	ACON	AEMEE-10000	Dipole Antenna	Reversed-SMA	3.24	4.54
	2	ACON	AEMEE-10000	Dipole Antenna	Reversed-SMA	3.24	4.54
Set	Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	
						2.4GHz	5GHz
2	3	ACON	AEP6P-100009	PIFA Antenna	I-PEX	3.15	3.15
	4	ACON	AEP6P-100010	PIFA Antenna	I-PEX	2.30	3.15

Dipole Cable	Brand	Model Name	Cable Length (mm)	Cable Loss (dB)		True Gain (dBi)	
				2.4GHz / BT	5GHz	2.4GHz / BT	5GHz
1	ACON	AEC8P-100000 (Gray) AEC8P-100001 (Black)	30	0.08	0.12	3.16	4.42
2	ACON	AEC8P-100002 (Gray) AEC8P-100003 (Black)	50	0.13	0.19	3.11	4.35
3	ACON	AEC8P-100004 (Gray) AEC8P-100005 (Black)	70	0.19	0.27	3.05	4.27
4	ACON	AEC8P-100006 (Gray) AEC8P-100007 (Black)	90	0.24	0.35	3.00	4.19
5	ACON	AEC8P-100008 (Gray) AEC8P-100009 (Black)	120	0.32	0.46	2.92	4.08
6	ACON	AEC8P-100010 (Gray) AEC8P-100011 (Black)	160	0.43	0.62	2.81	3.92
7	ACON	AEC8P-100012 (Gray) AEC8P-100013 (Black)	200	0.54	0.77	2.70	3.77
8	ACON	AEC8P-100014 (Gray) AEC8P-100015 (Black)	240	0.64	0.93	2.60	3.61
9	ACON	AEC8P-100016 (Gray) AEC8P-100017 (Black)	280	0.75	1.08	2.49	3.46
10	ACON	AEC8P-100018 (Gray) AEC8P-100019 (Black)	320	0.86	1.24	2.38	3.30
11	ACON	AEC8P-100020 (Gray) AEC8P-100021 (Black)	360	0.96	1.39	2.28	3.15
12	ACON	AEC8P-100022 (Gray) AEC8P-100023 (Black)	400	1.07	1.54	2.17	3.00



Dipole Cable	Brand	Model Name	Cable Length (mm)	Cable Loss (dB)		True Gain (dBi)	
				2.4GHz / BT	5GHz	2.4GHz / BT	5GHz
13	ACON	AEC8P-1000024 (Gray) AEC8P-1000025 (Black)	450	1.21	1.74	2.03	2.80
14	ACON	AEC8P-1000026 (Gray) AEC8P-1000027 (Black)	500	1.34	1.93	1.90	2.61
PIFA Cable	Brand	Model Name	Cable Length (mm)	True Gain (dBi)			
				2.4GHz / BT		5GHz	
15	ACON	AEP6P-100009 (Black)	300	3.15		3.15	
		AEP6P-100010 (Gray)	400	2.30		3.15	

Note: The EUT has two radios, Radio 1 supports WLAN 2.4GHz, WLAN 5GHz and Bluetooth function, Radio 2 supports WLAN 5GHz function only.

The EUT has two sets of antenna and there are two antennas for each set.

Dipole Antenna collocate with 14 set cable selling, only the higher gain antenna "cable 1" was tested and recorded in the report.

PIFA Antenna collocate with 1 set cable selling.

**For Radio 1 (WLAN 2.4GHz, WLAN 5GHz and Bluetooth):**

**For IEEE 802.11a/b/g/n/ac mode (1TX/1RX):**

Dipole Antenna: Only Ant. 1 (Port 1) can be used as transmitting/receiving antenna.

PIFA Antenna: Only Ant. 3 (Port 1) can be used as transmitting/receiving antenna.

**For Radio 2 (WLAN 5GHz):**

**For IEEE 802.11a/n/ac mode (1TX/1RX):**

Dipole Antenna: Only Ant. 2 (Port 1) can be used as transmitting/receiving antenna.

PIFA Antenna: Only Ant. 4 (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-LE(1Mbps)	0.626	2.034	391.25u	3k

### 1.1.4 EUT Operational Condition

EUT Power Type	From host system
----------------	------------------



### 1.1.5 Table for Class II Change

This product is an extension of original one reported under Sporton project number: FR770523AD

Below is the table for the change of the product with respect to the original one.

Modifications	Performance Checking
1. Adding a CPU shielding frame. 2. Adding a CPU shielding cover. 3. Adding a Thermal pad on CPU.	For Dipole Antenna necessary to evaluated as below: 1. Emissions in Restricted Frequency Bands Below 1GHz. 2. Emissions in Restricted Frequency Bands Above 1GHz for 2440 MHz only, and it is max power channel of original test report. (The test results are based on original output power to re-test.).
4. Adding one set PIFA antennas with lower gain than the original certificate.	For PIFA Antenna necessary to evaluated as below: 1. AC Power-line Conducted Emissions. 2. Emissions in Restricted Frequency Bands. 3. Simultaneous Transmission Analysis - Radiated Emission Co-location.
5. Adding master mode in band 2~band 3 (5250~5350 MHz, 5470~5725 MHz).	1. AC Power-line Conducted Emissions. 2. Emissions in Restricted Frequency Bands. 3. Simultaneous Transmission Analysis - Radiated Emission Co-location.  It doesn't need to verify RF test.



## 1.2 Testing Applied Standards

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

- 47 CFR FCC Part 15
- ANSI C63.10-2013
- FCC KDB 558074 D01 v04
- FCC KDB 412172 D01 v01r01

## 1.3 Testing Location Information

Testing Location				
<input type="checkbox"/>	HWA YA	ADD : No. 52, Hwa Ya 1st Rd., Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL : 886-3-327-3456 FAX : 886-3-318-0055		
<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
Radiated	03CH01-CB (below 1GHz)	Joy Tseng	23°C / 55%	Jul. 28, 2017, Nov. 23, 2017
Radiated	03CH01-CB (above 1GHz)	Joy Tseng	23°C / 55%	Nov. 28, 2017~Dec. 13, 2017
AC Conduction	CO01-CB	Tony Chang	22°C / 52%	Nov. 27, 2017

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)	3.2 dB	Confidence levels of 95%
Radiated Emission (30MHz ~ 1,000MHz)	3.6 dB	Confidence levels of 95%
Radiated Emission (1GHz ~ 18GHz)	3.7 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	3.5 dB	Confidence levels of 95%



## 2 Test Configuration of EUT

### 2.1 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	Slave mode - Radio 1 (2.4GHz + Bluetooth) + Radio 2 (5GHz) with PIFA antenna

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 Slave Mode - Radio 1 (2.4GHz+Bluetooth)+ Radio 2 (5GHz) with Dipole antenna
2	EUT in Z axis AP Mode - Radio 1 (2.4GHz+Bluetooth)+ Radio 2 (5GHz) with PIFA antenna
<b>Operating Mode &gt; 1GHz</b>	CTX
1	EUT in Z axis with Dipole antenna
2	EUT in Z axis with PIFA antenna



The Worst Case Mode for Following Conformance Tests	
<b>Tests Item</b>	Simultaneous Transmission Analysis - Radiated Emission Co-location
<b>Test Condition</b>	Radiated measurement
<b>Operating Mode</b>	Normal Link
1	EUT X axis - Radio 1 (2.4GHz + Bluetooth) + Radio 2 (5GHz) with PIFA antenna
2	EUT Y axis - Radio 1 (2.4GHz + Bluetooth) + Radio 2 (5GHz) with PIFA antenna
3	EUT Z axis - Radio 1 (2.4GHz + Bluetooth) + Radio 2 (5GHz) with PIFA antenna
4	EUT X axis - Radio 1 (5GHz + Bluetooth) + Radio 2 (5GHz) with PIFA antenna
5	EUT Y axis - Radio 1 (5GHz + Bluetooth) + Radio 2 (5GHz) with PIFA antenna
6	EUT Z axis - Radio 1 (5GHz + Bluetooth) + Radio 2 (5GHz) with PIFA antenna

For operating mode 2 and mode 5 are the worst case and it was record in this test report.

Refer to Appendix D for Radiated Emission Co-location.

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	Radio 1 (2.4GHz + Bluetooth) + Radio 2 (5GHz)
2	Radio 1 (5GHz + Bluetooth) + Radio 2 (5GHz)

Refer to Sporton Test Report No.: FA770523-01 for Co-location RF Exposure Evaluation.

## 2.2 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.



## 2.3 Accessories

N/A

## 2.4 Support Equipment

For Test Site No: CO01-CB

Support Equipment				
No.	Equipment	Brand Name	Model Name	FCC ID
1	NB	DELL	E6430	DoC
2	Bluetooth Speaker	MARUS	MSK06C-RD	DoC
3	AP Router	ASUS	DSL-AC68U	DoC
4	AP Router	Planex	GW-AP54SGX	KA220030603014-1
5	Fixture	Arcadyan	WN9711BTAAC Test jig	N/A

For Test Site No: 03CH01-CB (below 1GHz)

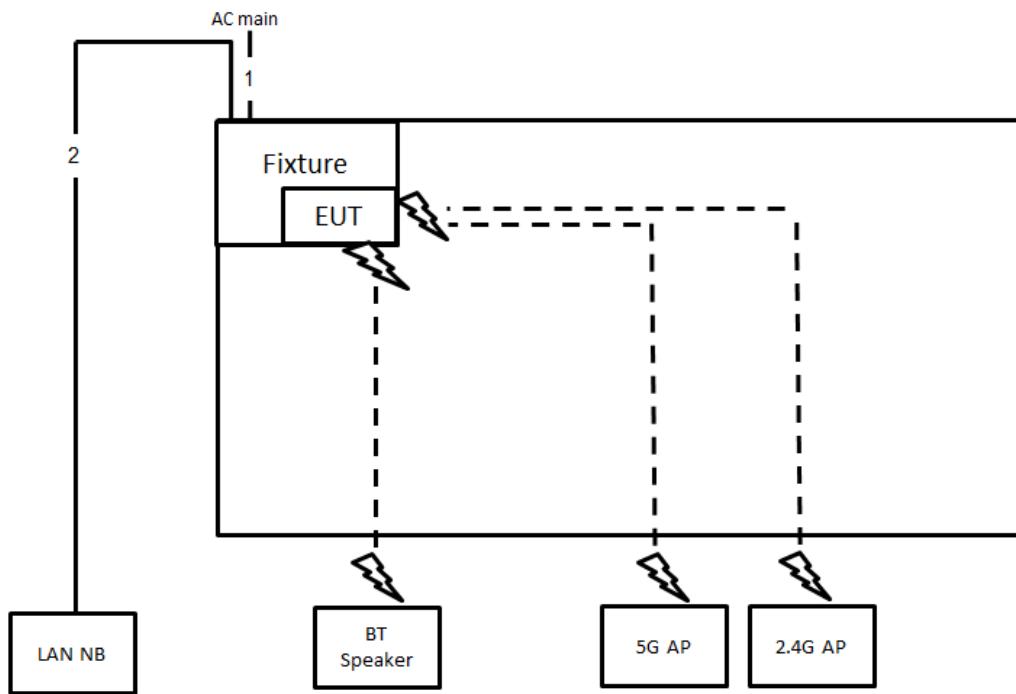
Support Equipment				
No.	Equipment	Brand Name	Model Name	FCC ID
1	NB	DELL	E4300	DoC
2	NB*2	Apple	Mac Book	DoC
3	Bluetooth Speaker	MARUS	MSK06C-RD	DoC
4	Fixture	Arcadyan	WN9711BTAAC Test jig	N/A

For Test Site No: 03CH01-CB (above 1GHz)

Support Equipment				
No.	Equipment	Brand Name	Model Name	FCC ID
1	NB	DELL	E4300	DoC
2	Fixture	Arcadyan	WN9711BTAAC Test jig	N/A

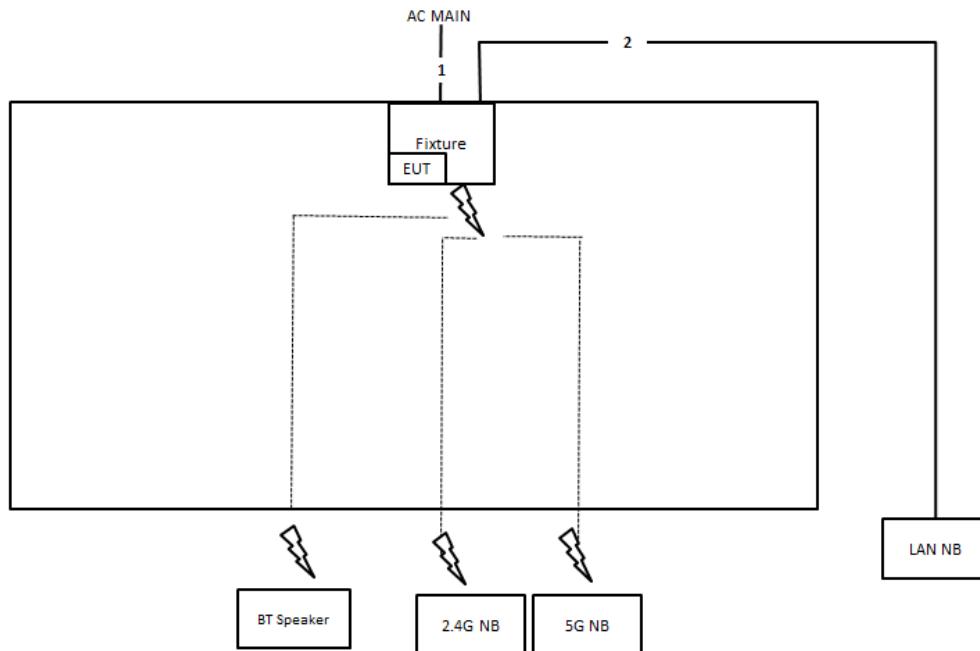
## 2.5 Test Setup Diagram

Test Setup Diagram – AC Line Conducted Emission Test



Item	Connection	Shielded	Length
1	Power cable	No	0.8m
2	RJ-45 cable	No	10m

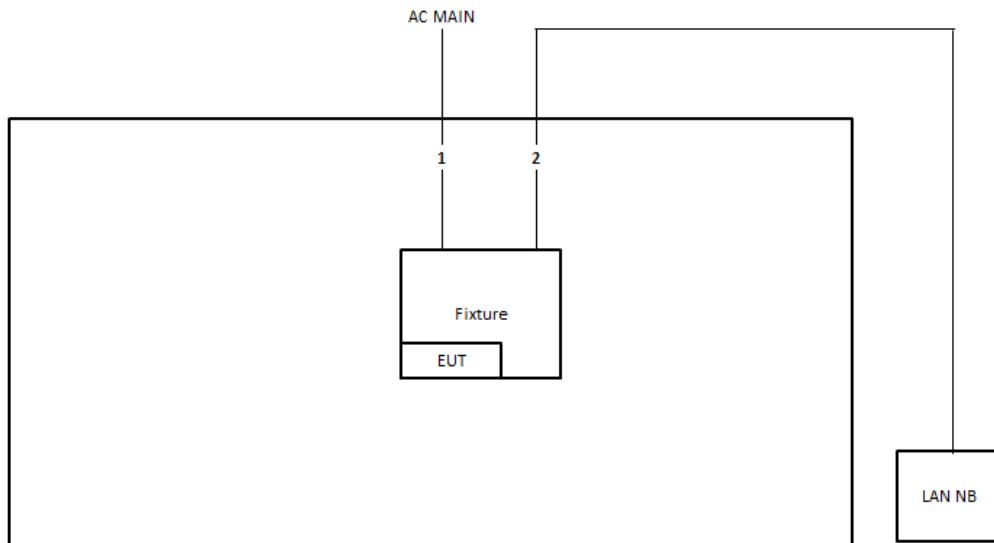
## Test Setup Diagram - Radiated Test &lt; 1GHz



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



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



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

### 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

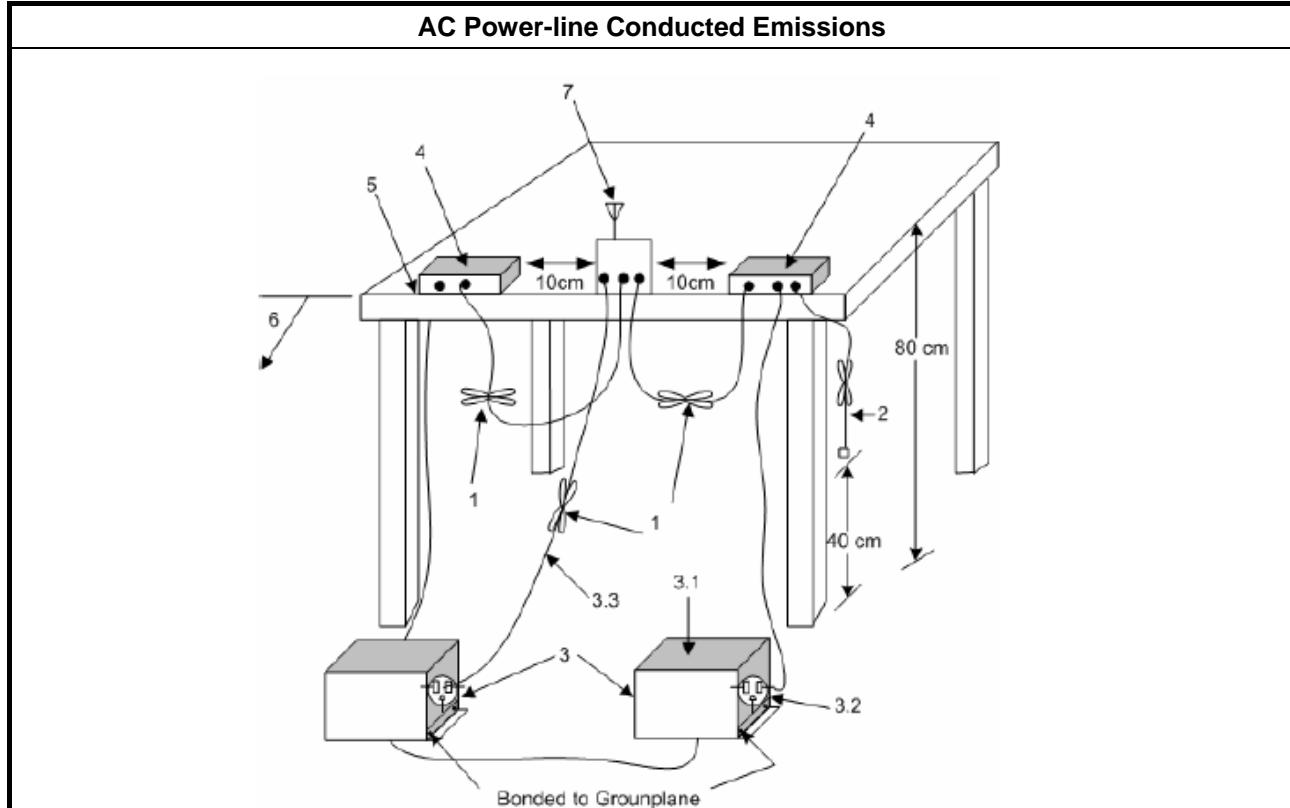
Refer a test equipment and calibration data table in this test report.

### 3.1.3 Test Procedures

Test Method
▪ Refer as ANSI C63.10-2013, clause 6.2 for AC power-line conducted emissions.

- Refer as ANSI C63.10-2013, clause 6.2 for AC power-line conducted emissions.

### 3.1.4 Test Setup



### 3.1.5 Test Result of AC Power-line Conducted Emissions

Refer as Appendix B



## 3.2 Emissions in Restricted Frequency Bands

### 3.2.1 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.

### 3.2.2 Measuring Instruments

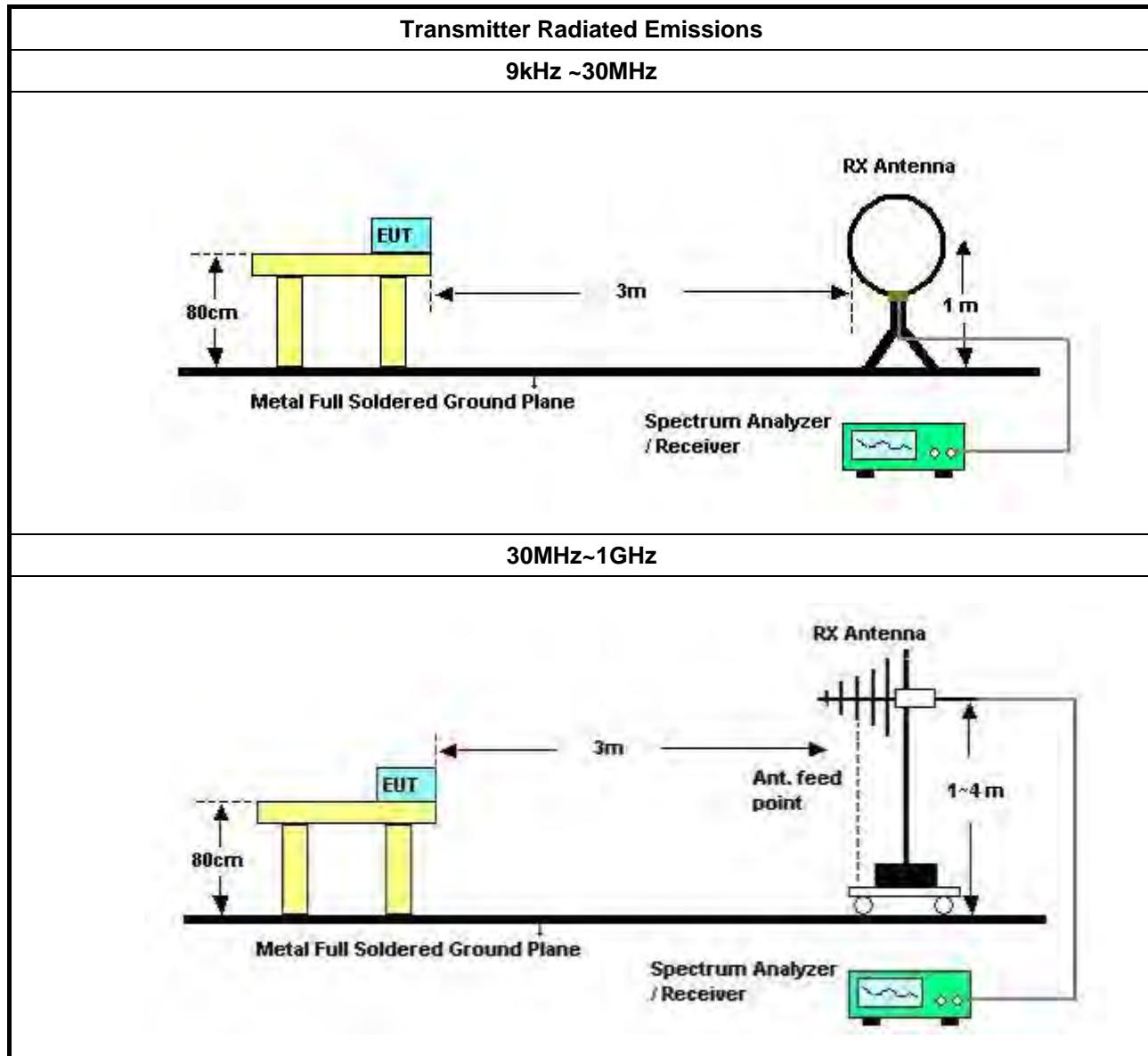
Refer a test equipment and calibration data table in this test report.

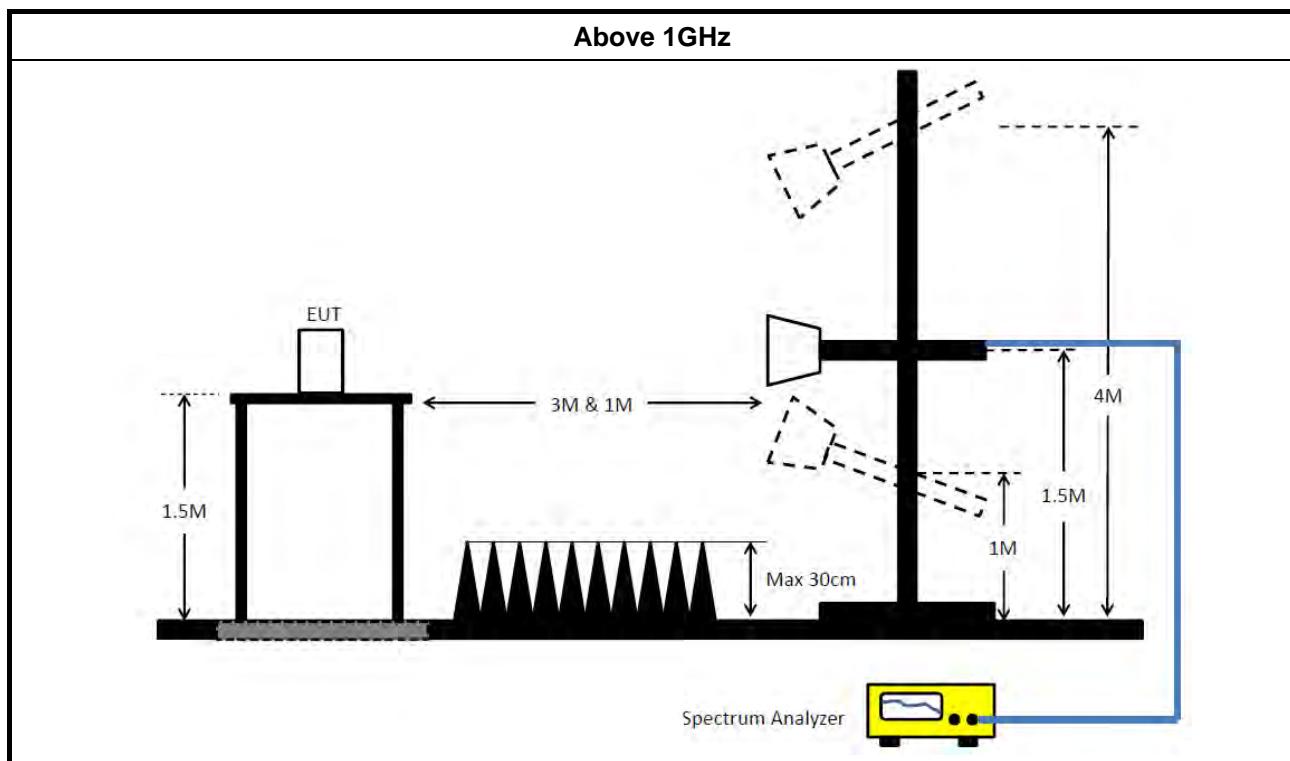


### 3.2.3 Test Procedures

<b>Test Method</b>	
<ul style="list-style-type: none"><li>▪ The average emission levels shall be measured in [duty cycle <math>\geq</math> 98 or duty factor].</li></ul>	
<ul style="list-style-type: none"><li>▪ Refer as ANSI C63.10, clause 6.9.2.2 band-edge testing shall be performed at the lowest frequency channel and highest frequency channel within the allowed operating band.</li></ul>	
<ul style="list-style-type: none"><li>▪ For the transmitter unwanted emissions shall be measured using following options below:</li></ul>	
<ul style="list-style-type: none"><li>▪ Refer as FCC KDB 558074, clause 12 for unwanted emissions into restricted bands.</li></ul>	
	<input type="checkbox"/> Refer as FCC KDB 558074, clause 12.2.5.1 Option 1 (trace averaging for duty cycle $\geq 98\%$ )
	<input type="checkbox"/> Refer as FCC KDB 558074, clause 12.2.5.2 Option 2 (trace averaging + duty factor).
	<input checked="" type="checkbox"/> Refer as FCC KDB 558074, clause 12.2.5.3 Option 3 (Reduced $VBW \geq 1/T$ ).
	<input type="checkbox"/> Refer as ANSI C63.10, clause 4.2.3.2.3 (Reduced $VBW$ ). $VBW \geq 1/T$ , where $T$ is pulse time.
	<input type="checkbox"/> Refer as ANSI C63.10, clause 4.2.3.2.4 average value of pulsed emissions.
	<input checked="" type="checkbox"/> Refer as FCC KDB 558074, clause 12.2.4 measurement procedure peak limit.
<ul style="list-style-type: none"><li>▪ For the transmitter band-edge emissions shall be measured using following options below:</li></ul>	
	<ul style="list-style-type: none"><li>▪ Refer as FCC KDB 558074 clause 13.1, When the performing peak or average radiated measurements, emissions within 2 MHz of the authorized band edge may be measured using the marker-delta method described below.</li></ul>
	<ul style="list-style-type: none"><li>▪ Refer as FCC KDB 558074, clause 13.2 (ANSI C63.10, clause 6.9.3) for marker-delta method for band-edge measurements.</li></ul>
	<ul style="list-style-type: none"><li>▪ Refer as FCC KDB 558074, clause 13.3 for narrower resolution bandwidth (100kHz) using the band power and summing the spectral levels (i.e., 1 MHz).</li></ul>
<ul style="list-style-type: none"><li>▪ For conducted and cabinet radiation measurement, refer as FCC KDB 558074, clause 12.2.2.</li></ul>	
	<ul style="list-style-type: none"><li>▪ For conducted unwanted emissions into restricted bands (absolute emission limits). Devices with multiple transmit chains using options given below:<ol style="list-style-type: none"><li>(1) Measure and sum the spectra across the outputs or</li><li>(2) Measure and add <math>10 \log(N)</math> dB</li></ol></li></ul>
	<ul style="list-style-type: none"><li>▪ For FCC KDB 662911 The methodology described here may overestimate array gain, thereby resulting in apparent failures to satisfy the out-of-band limits even if the device is actually compliant. In such cases, compliance may be demonstrated by performing radiated tests around the frequencies at which the apparent failures occurred.</li></ul>

### 3.2.4 Test Setup





### 3.2.5 Transmitter Radiated Unwanted Emissions (Below 30MHz)

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

### 3.2.6 Transmitter Radiated Unwanted Emissions

Refer as Appendix C



## 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	Jan. 23, 2017	Jan. 22, 2018	Conduction (CO01-CB)
LISN	F.C.C.	FCC-LISN-50-16-2	04083	150kHz ~ 100MHz	Dec. 14, 2016	Dec. 13, 2017	Conduction (CO01-CB)
LISN	Schwarzbeck	NSLK 8127	8127647	9kHz ~ 30MHz	Dec. 21, 2016	Dec. 20, 2017	Conduction (CO01-CB)
COND Cable	Woken	Cable	01	150kHz ~ 30MHz	May 23, 2017	May 22, 2018	Conduction (CO01-CB)
Software	Audix	E3	6.120210n	-	N.C.R.	N.C.R.	Conduction (CO01-CB)
BILOG ANTENNA with 6dB Attenuator	TESEQ & EMCI	CBL6112D & N-6-06	37880 & AT-N0609	20MHz ~ 2GHz	Aug. 30, 2016	Aug. 29, 2017	Radiation (03CH01-CB)
BILOG ANTENNA with 6dB Attenuator	TESEQ & EMCI	CBL6112D & N-6-06	37880 & AT-N0609	20MHz ~ 2GHz	Aug. 30, 2017	Aug. 29, 2018	Radiation (03CH01-CB)
Horn Antenna	EMCO	3115	00075790	750MHz ~ 18GHz	Nov. 20, 2017	Nov. 19, 2018	Radiation (03CH01-CB)
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Jul. 05, 2017	Jul. 04, 2018	Radiation (03CH01-CB)
Pre-Amplifier	EMCI	EMC330N	980332	20MHz ~ 3GHz	May 02, 2017	May 01, 2018	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8449B	3008A02310	1GHz ~ 26.5GHz	Jan. 16, 2017	Jan. 15, 2018	Radiation (03CH01-CB)
Pre-Amplifier	MITEQ	TTA1840-35-HG	1864479	18GHz ~ 40GHz	Jul. 10, 2017	Jul. 09, 2018	Radiation (03CH01-CB)
Spectrum Analyzer	R&S	FSP40	100056	9kHz ~ 40GHz	Nov. 22, 2016	Nov. 21, 2017	Radiation (03CH01-CB)
Spectrum Analyzer	R&S	FSP40	100056	9kHz ~ 40GHz	Nov. 23, 2017	Nov. 22, 2018	Radiation (03CH01-CB)
EMI Test	R&S	ESCS	100355	9kHz ~ 2.75GHz	May 06, 2017	May 05, 2018	Radiation (03CH01-CB)
RF Cable-low	Woken	Low Cable-16+17	N/A	30 MHz ~ 1 GHz	Oct. 24, 2016	Oct. 23, 2017	Radiation (03CH01-CB)
RF Cable-low	Woken	Low Cable-16+17	N/A	30 MHz ~ 1 GHz	Oct. 11, 2017	Oct. 10, 2018	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-16	N/A	1 GHz ~ 18 GHz	Oct. 11, 2017	Oct. 10, 2018	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-16+17	N/A	1 GHz ~ 18 GHz	Oct. 11, 2017	Oct. 10, 2018	Radiation (03CH01-CB)

**FCC Test Report****Report No. : FR770523-01AD**

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
RF Cable-high	Woken	High Cable-40G#1	N/A	18GHz ~ 40 GHz	Oct. 11, 2017	Oct. 10, 2018	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-40G#2	N/A	18GHz ~ 40 GHz	Oct. 11, 2017	Oct. 10, 2018	Radiation (03CH01-CB)
Loop Antenna	Teseq	HLA 6120	24155	9kHz - 30 MHz	Mar. 16, 2016*	Mar. 15, 2018*	Radiation (03CH01-CB)

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

“\*” Calibration Interval of instruments listed above is two years.

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



## AC Power-line Conducted Emissions Result

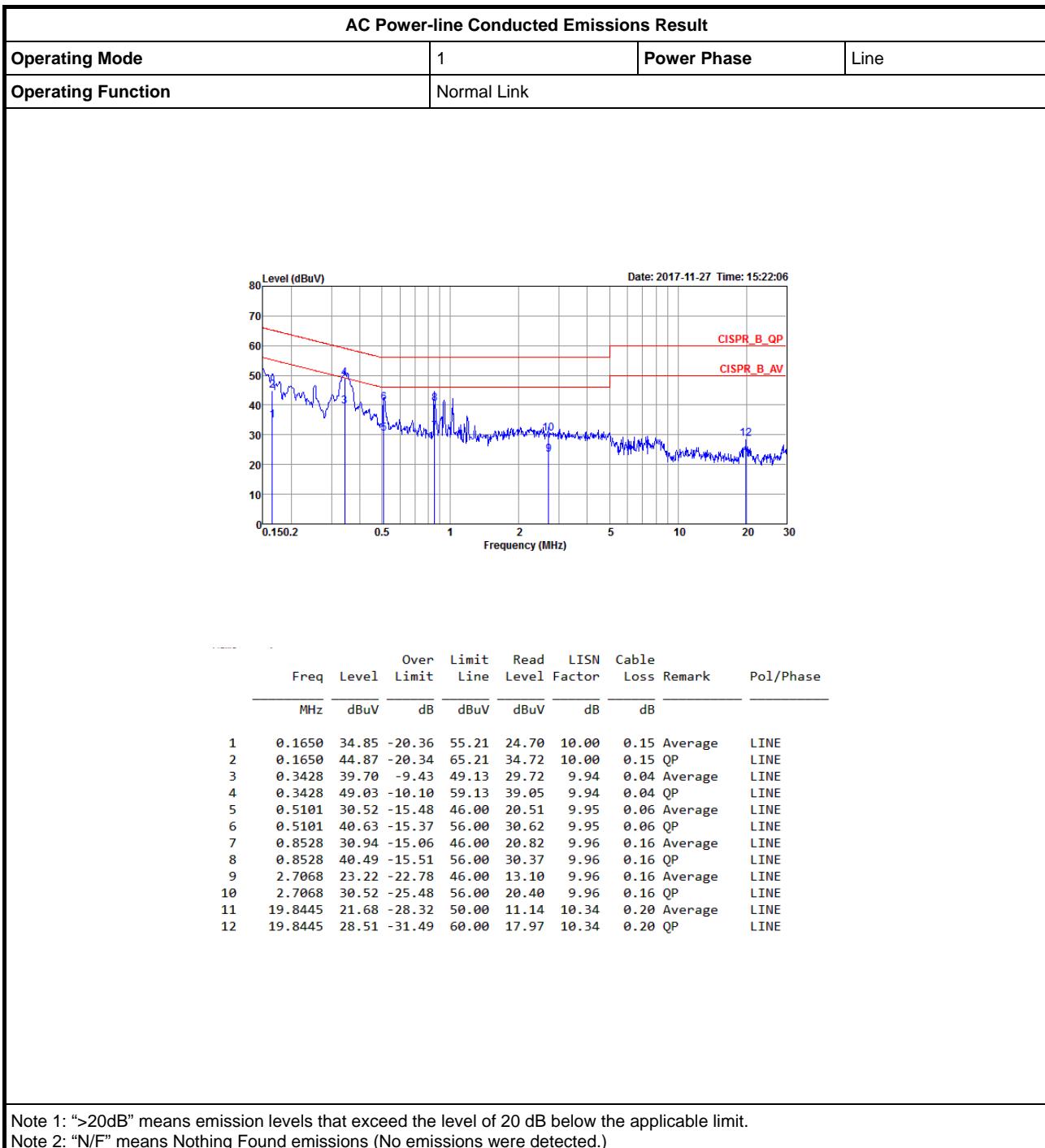
Appendix B

AC Power-line Conducted Emissions Result																																																																																																																																																					
Operating Mode		1	Power Phase		Neutral																																																																																																																																																
Operating Function		Normal Link																																																																																																																																																			
<table><thead><tr><th>Freq</th><th>Level</th><th>Over Limit</th><th>Limit</th><th>Read Line</th><th>LISN</th><th>Cable Factor</th><th>Loss</th><th>Remark</th><th>Pol/Phase</th></tr><tr><th>MHz</th><th>dBuV</th><th>dB</th><th>dBuV</th><th>dBuV</th><th>dB</th><th>dB</th><th>dB</th><th></th><th></th></tr></thead><tbody><tr><td>1</td><td>0.1677</td><td>35.07</td><td>-20.01</td><td>55.08</td><td>24.82</td><td>10.10</td><td>0.15</td><td>Average</td><td>NEUTRAL</td></tr><tr><td>2</td><td>0.1677</td><td>45.16</td><td>-19.92</td><td>65.08</td><td>34.91</td><td>10.10</td><td>0.15</td><td>QP</td><td>NEUTRAL</td></tr><tr><td>3</td><td>0.3410</td><td>39.91</td><td>-9.27</td><td>49.18</td><td>29.68</td><td>10.19</td><td>0.04</td><td>Average</td><td>NEUTRAL</td></tr><tr><td>4</td><td>0.3410</td><td>49.13</td><td>-10.05</td><td>59.18</td><td>38.90</td><td>10.19</td><td>0.04</td><td>QP</td><td>NEUTRAL</td></tr><tr><td>5</td><td>0.5101</td><td>30.74</td><td>-15.26</td><td>46.00</td><td>20.46</td><td>10.22</td><td>0.06</td><td>Average</td><td>NEUTRAL</td></tr><tr><td>6</td><td>0.5101</td><td>40.87</td><td>-15.13</td><td>56.00</td><td>30.59</td><td>10.22</td><td>0.06</td><td>QP</td><td>NEUTRAL</td></tr><tr><td>7</td><td>0.8528</td><td>30.66</td><td>-15.34</td><td>46.00</td><td>20.40</td><td>10.10</td><td>0.16</td><td>Average</td><td>NEUTRAL</td></tr><tr><td>8</td><td>0.8528</td><td>39.92</td><td>-16.08</td><td>56.00</td><td>29.66</td><td>10.10</td><td>0.16</td><td>QP</td><td>NEUTRAL</td></tr><tr><td>9</td><td>4.7464</td><td>22.24</td><td>-23.76</td><td>46.00</td><td>12.14</td><td>9.99</td><td>0.11</td><td>Average</td><td>NEUTRAL</td></tr><tr><td>10</td><td>4.7464</td><td>29.32</td><td>-26.68</td><td>56.00</td><td>19.22</td><td>9.99</td><td>0.11</td><td>QP</td><td>NEUTRAL</td></tr><tr><td>11</td><td>20.9243</td><td>21.80</td><td>-28.20</td><td>50.00</td><td>11.23</td><td>10.36</td><td>0.21</td><td>Average</td><td>NEUTRAL</td></tr><tr><td>12</td><td>20.9243</td><td>28.66</td><td>-31.34</td><td>60.00</td><td>18.09</td><td>10.36</td><td>0.21</td><td>QP</td><td>NEUTRAL</td></tr></tbody></table>										Freq	Level	Over Limit	Limit	Read Line	LISN	Cable Factor	Loss	Remark	Pol/Phase	MHz	dBuV	dB	dBuV	dBuV	dB	dB	dB			1	0.1677	35.07	-20.01	55.08	24.82	10.10	0.15	Average	NEUTRAL	2	0.1677	45.16	-19.92	65.08	34.91	10.10	0.15	QP	NEUTRAL	3	0.3410	39.91	-9.27	49.18	29.68	10.19	0.04	Average	NEUTRAL	4	0.3410	49.13	-10.05	59.18	38.90	10.19	0.04	QP	NEUTRAL	5	0.5101	30.74	-15.26	46.00	20.46	10.22	0.06	Average	NEUTRAL	6	0.5101	40.87	-15.13	56.00	30.59	10.22	0.06	QP	NEUTRAL	7	0.8528	30.66	-15.34	46.00	20.40	10.10	0.16	Average	NEUTRAL	8	0.8528	39.92	-16.08	56.00	29.66	10.10	0.16	QP	NEUTRAL	9	4.7464	22.24	-23.76	46.00	12.14	9.99	0.11	Average	NEUTRAL	10	4.7464	29.32	-26.68	56.00	19.22	9.99	0.11	QP	NEUTRAL	11	20.9243	21.80	-28.20	50.00	11.23	10.36	0.21	Average	NEUTRAL	12	20.9243	28.66	-31.34	60.00	18.09	10.36	0.21	QP	NEUTRAL
Freq	Level	Over Limit	Limit	Read Line	LISN	Cable Factor	Loss	Remark	Pol/Phase																																																																																																																																												
MHz	dBuV	dB	dBuV	dBuV	dB	dB	dB																																																																																																																																														
1	0.1677	35.07	-20.01	55.08	24.82	10.10	0.15	Average	NEUTRAL																																																																																																																																												
2	0.1677	45.16	-19.92	65.08	34.91	10.10	0.15	QP	NEUTRAL																																																																																																																																												
3	0.3410	39.91	-9.27	49.18	29.68	10.19	0.04	Average	NEUTRAL																																																																																																																																												
4	0.3410	49.13	-10.05	59.18	38.90	10.19	0.04	QP	NEUTRAL																																																																																																																																												
5	0.5101	30.74	-15.26	46.00	20.46	10.22	0.06	Average	NEUTRAL																																																																																																																																												
6	0.5101	40.87	-15.13	56.00	30.59	10.22	0.06	QP	NEUTRAL																																																																																																																																												
7	0.8528	30.66	-15.34	46.00	20.40	10.10	0.16	Average	NEUTRAL																																																																																																																																												
8	0.8528	39.92	-16.08	56.00	29.66	10.10	0.16	QP	NEUTRAL																																																																																																																																												
9	4.7464	22.24	-23.76	46.00	12.14	9.99	0.11	Average	NEUTRAL																																																																																																																																												
10	4.7464	29.32	-26.68	56.00	19.22	9.99	0.11	QP	NEUTRAL																																																																																																																																												
11	20.9243	21.80	-28.20	50.00	11.23	10.36	0.21	Average	NEUTRAL																																																																																																																																												
12	20.9243	28.66	-31.34	60.00	18.09	10.36	0.21	QP	NEUTRAL																																																																																																																																												
<p>Note 1: "&gt;20dB" means emission levels that exceed the level of 20 dB below the applicable limit.</p> <p>Note 2: "N/F" means Nothing Found emissions (No emissions were detected.)</p>																																																																																																																																																					



## AC Power-line Conducted Emissions Result

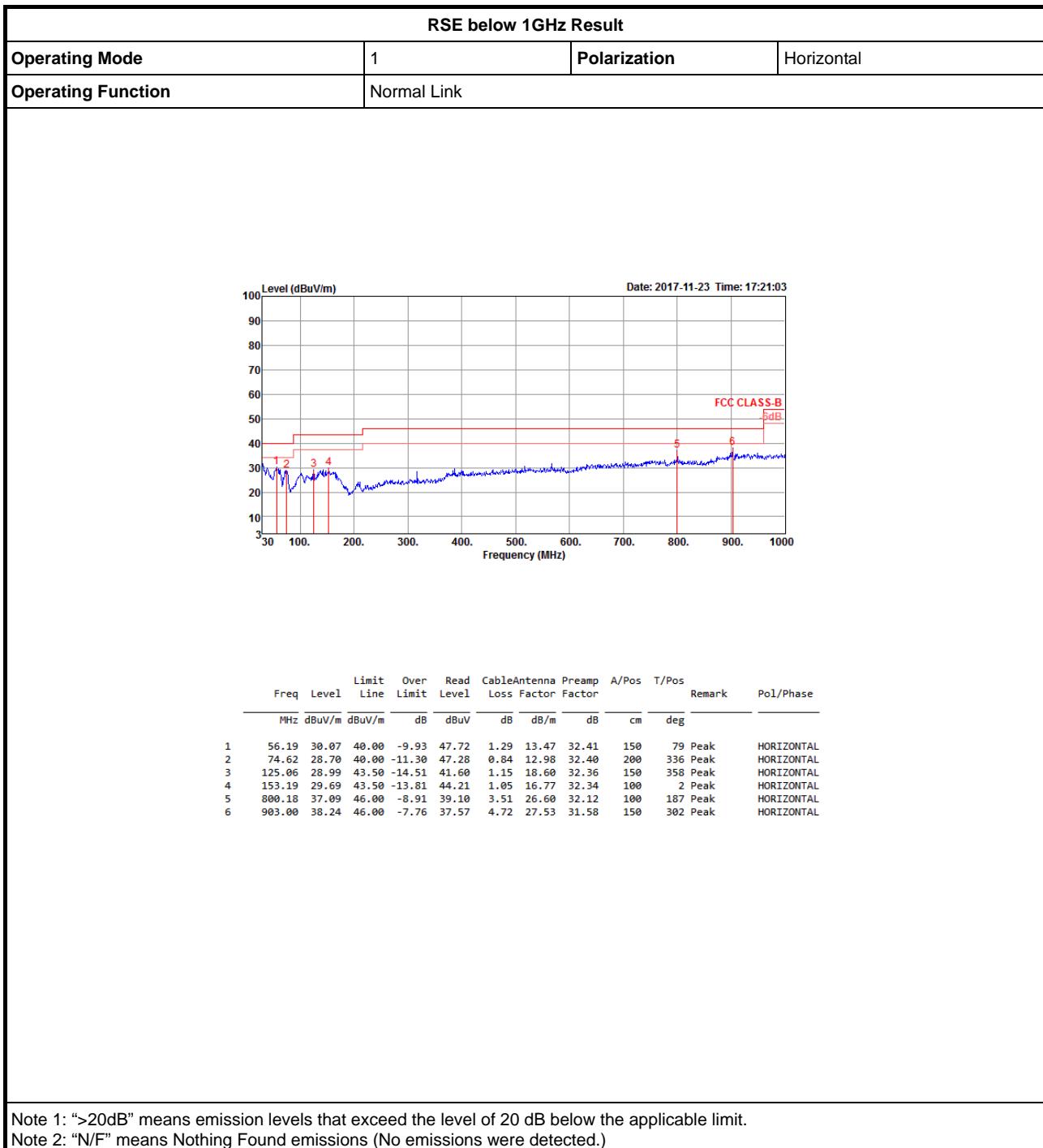
Appendix B





## RSE below 1GHz Result

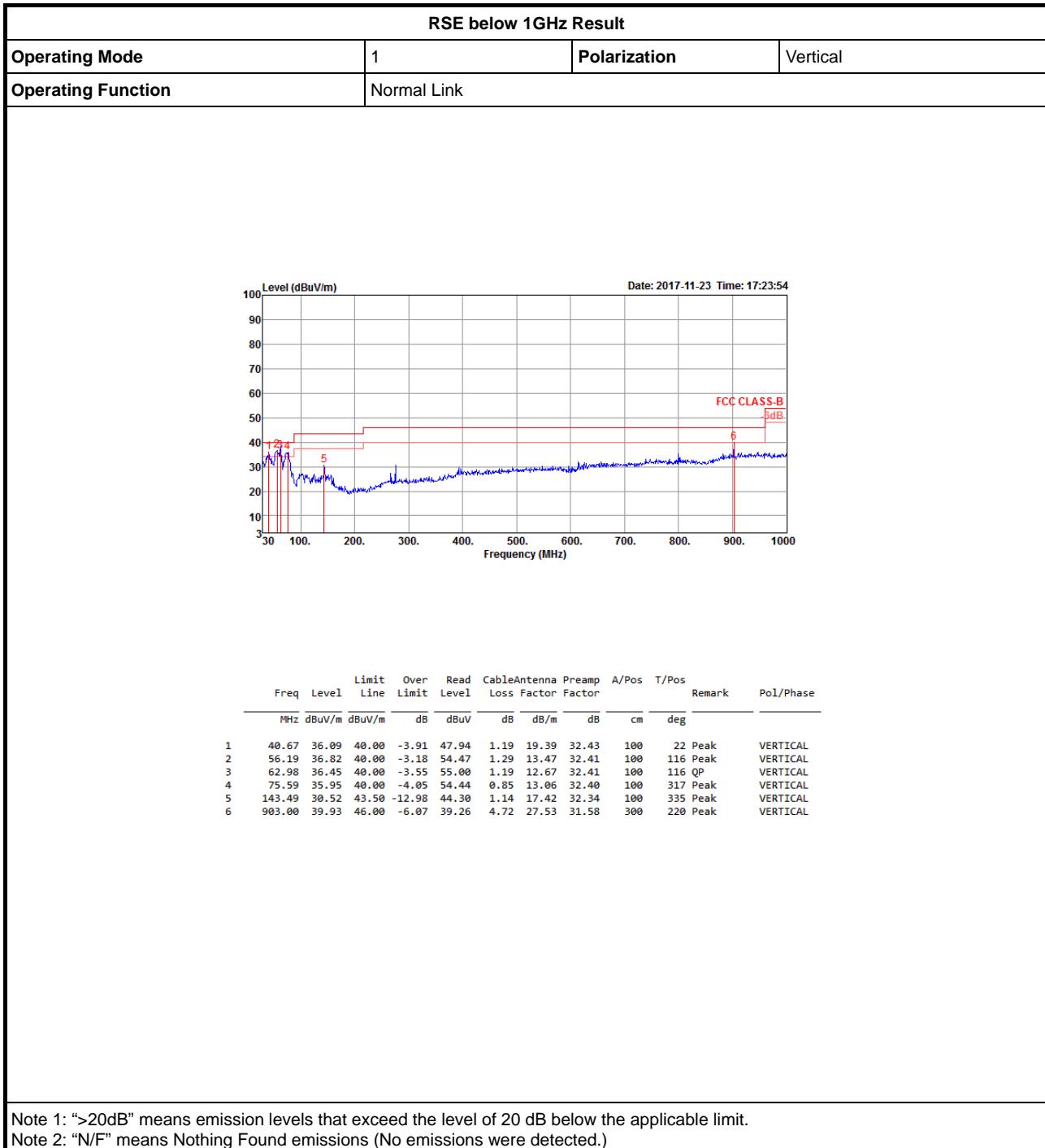
## Appendix C.1





## RSE below 1GHz Result

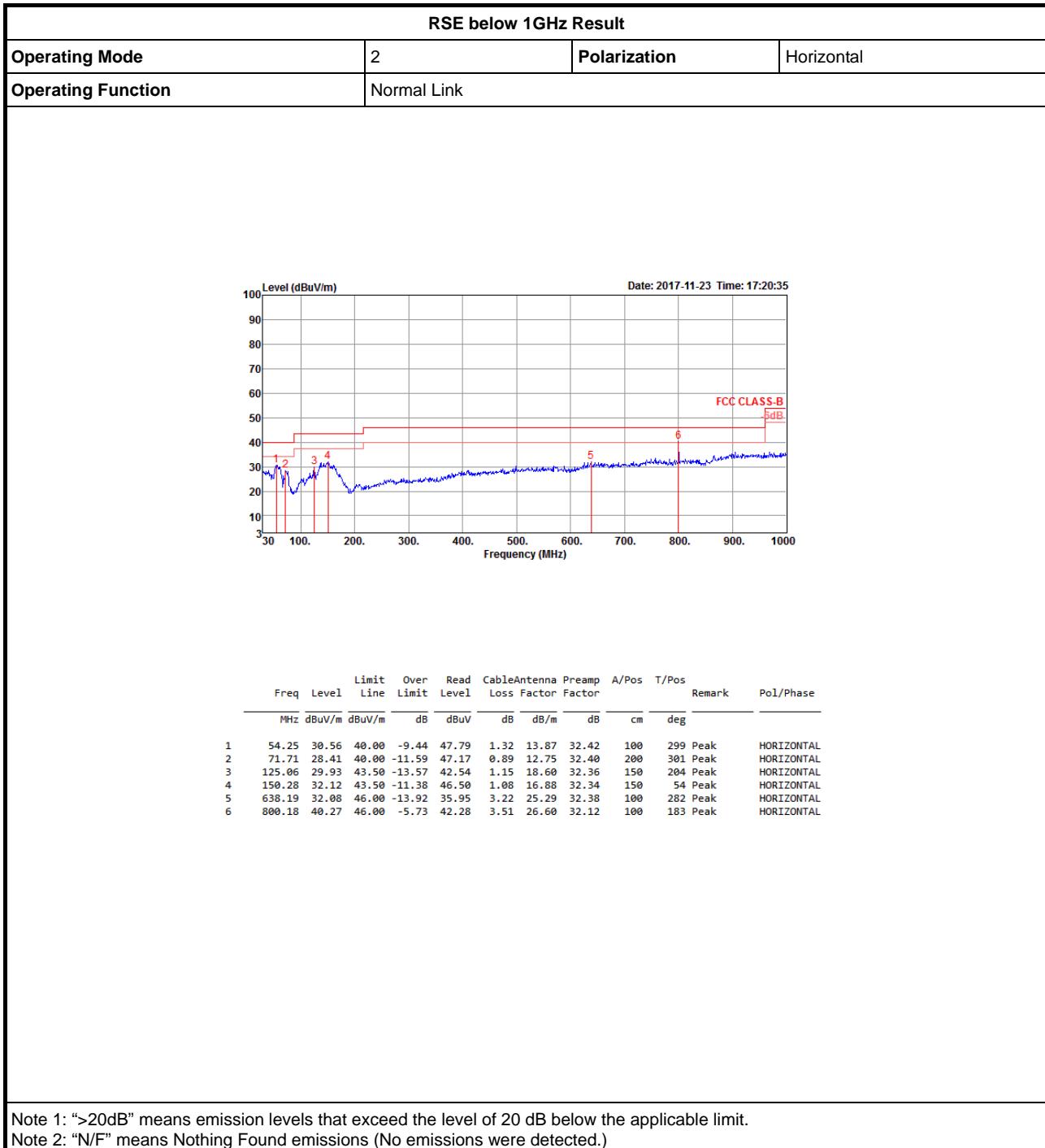
Appendix C.1





## RSE below 1GHz Result

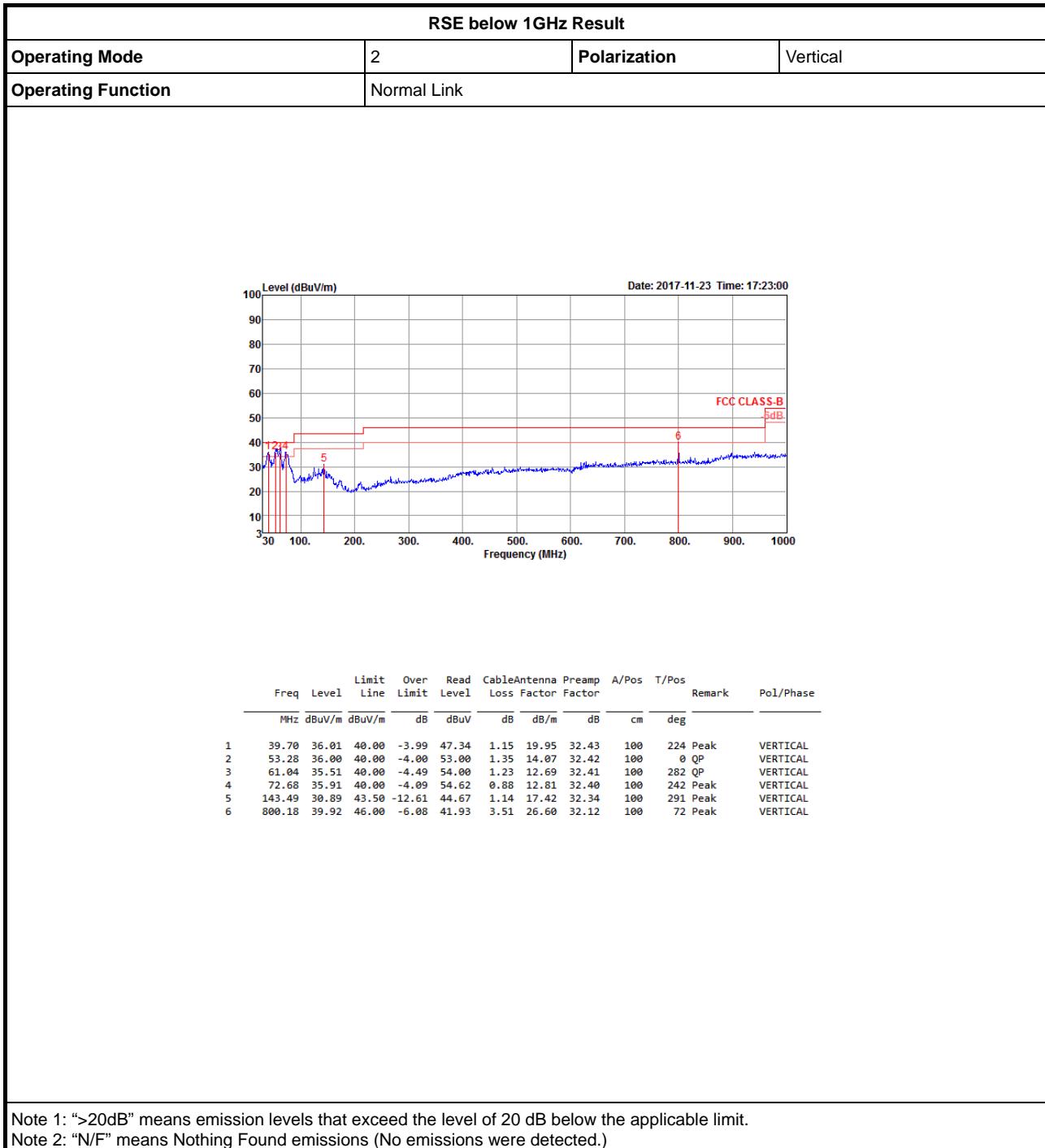
Appendix C.1





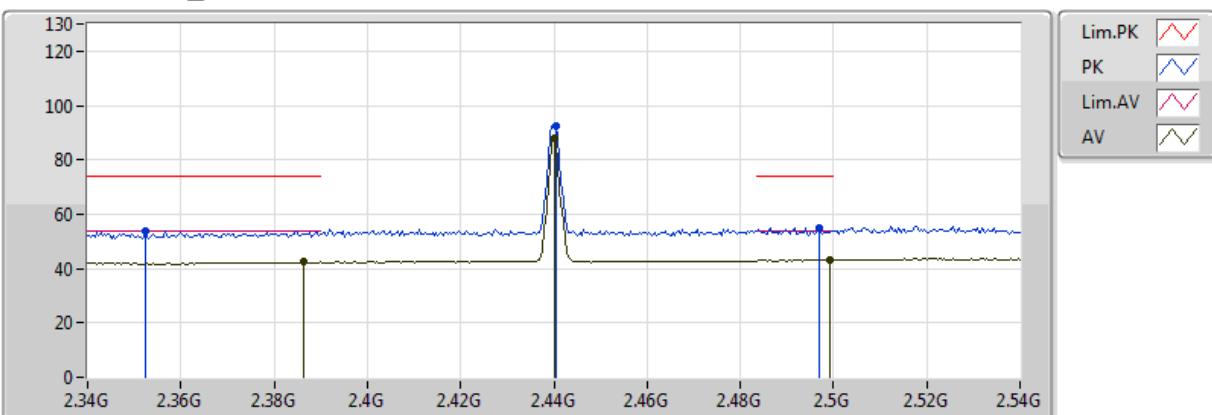
## RSE below 1GHz Result

Appendix C.1



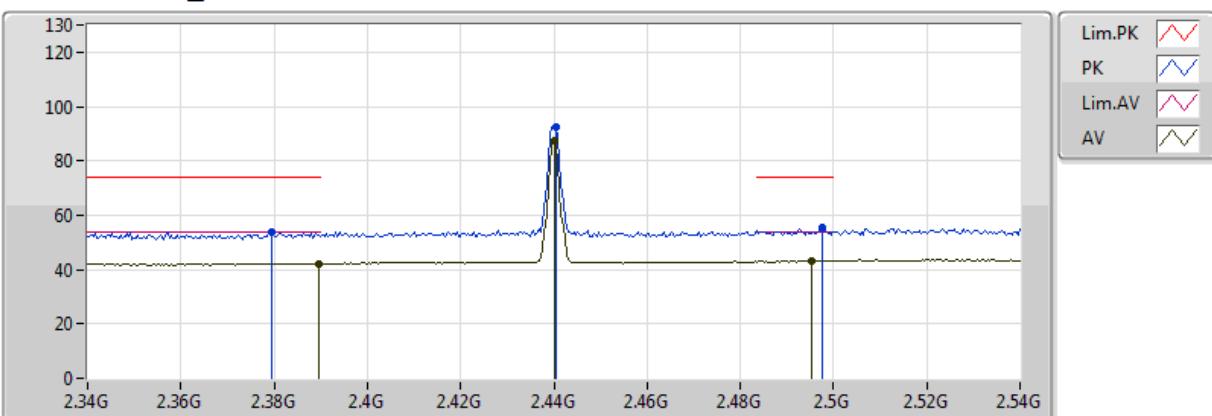
**For Dipole Antenna  
Summary**

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Pol. (H/V)	Azimuth (°)	Height (m)	Comments
BT-LE(1Mbps)	-	-	-	-	-	-	-	-	-	-	-	-
2.4-2.4835GHz	Pass	AV	2.4952G	43.25	54.00	-10.75	30.59	3	H	202	1.77	-

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


20171212  
 EUT Z\_1TX  
 Setting Default  
 05-E-3  
 FSP

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	2.3864G	42.35	54.00	-11.65	29.93	3	V	40	2.10	-
AV	2.44G	87.71	Inf	-Inf	30.21	3	V	40	2.10	-
AV	2.4992G	43.16	54.00	-10.84	30.61	3	V	40	2.10	-
PK	2.3524G	54.02	74.00	-19.98	29.89	3	V	40	2.10	-
PK	2.4404G	92.69	Inf	-Inf	30.21	3	V	40	2.10	-
PK	2.4968G	55.07	74.00	-18.93	30.60	3	V	40	2.10	-

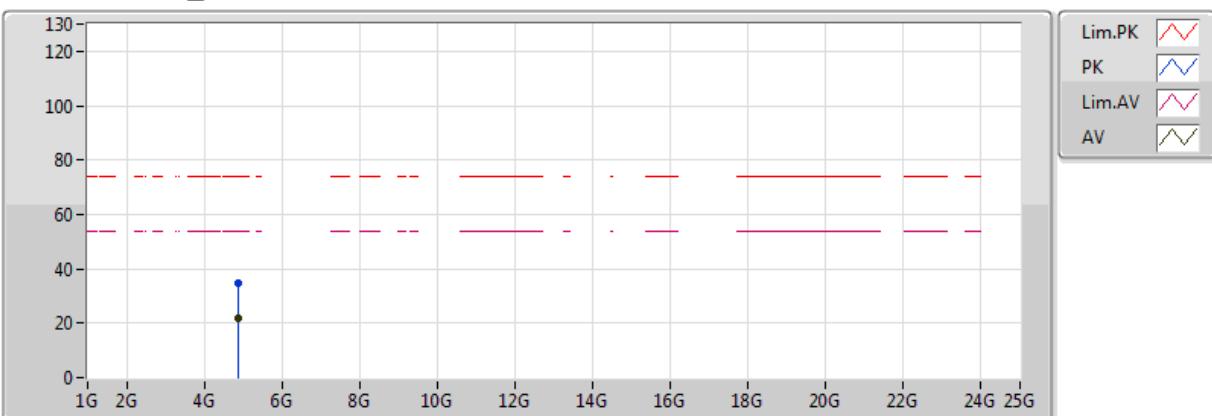
**BT-LE(1Mbps)**
**2440MHz\_TX**


20171212  
EUT Z\_1TX  
Setting Default  
05-E-3  
FSP

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	2.3896G	42.29	54.00	-11.71	29.93	3	H	202	1.77	-
AV	2.44G	87.64	Inf	-Inf	30.21	3	H	202	1.77	-
AV	2.4952G	43.25	54.00	-10.75	30.59	3	H	202	1.77	-
PK	2.3796G	53.93	74.00	-20.07	29.92	3	H	202	1.77	-
PK	2.4404G	92.40	Inf	-Inf	30.21	3	H	202	1.77	-
PK	2.4976G	55.48	74.00	-18.52	30.60	3	H	202	1.77	-

### **BT-LE(1Mbps)**

#### **2440MHz\_TX**



20171212  
EUT Z\_1TX  
Setting Default  
05-E-3  
FSP

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	4.87544G	21.73	54.00	-32.27	4.26	3	V	46	1.56	-
PK	4.87592G	34.73	74.00	-39.27	4.26	3	V	46	1.56	-



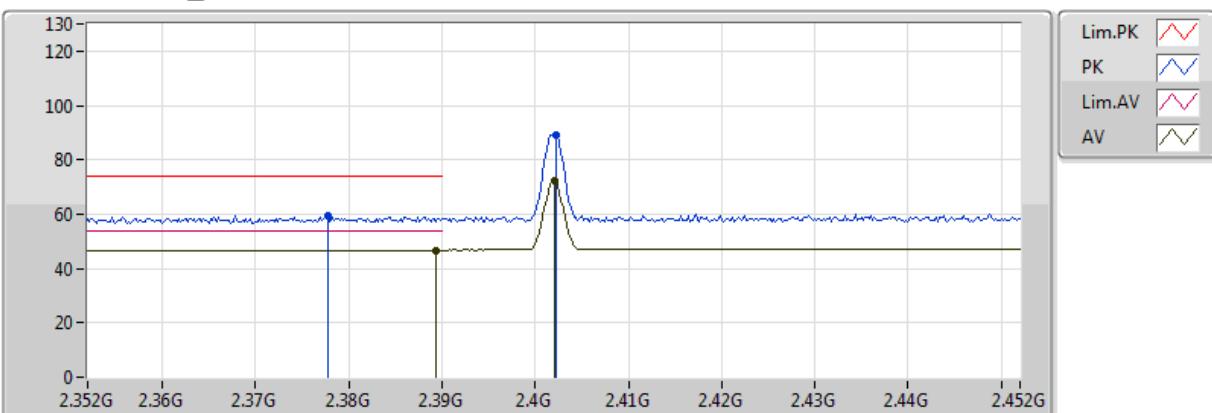
### **BT-LE(1Mbps)**

#### **2440MHz\_TX**



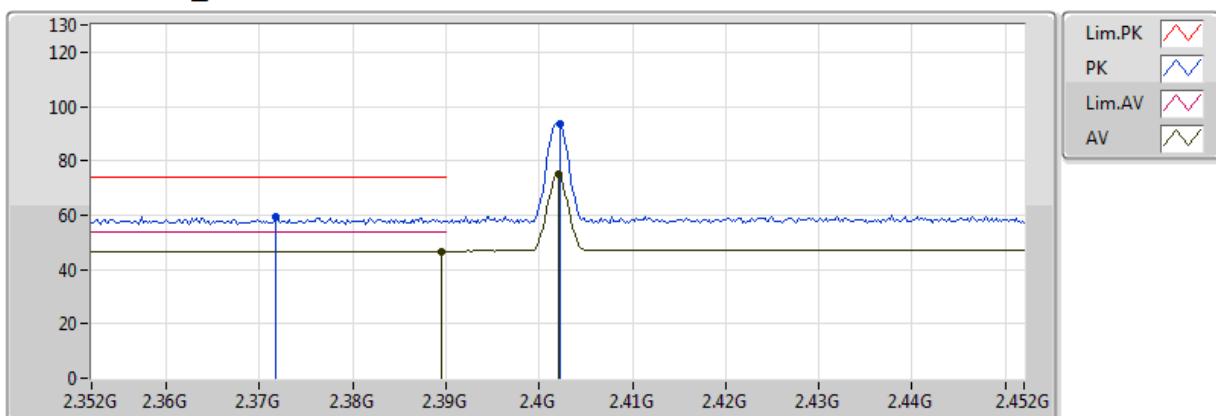
**For PIFA Antenna  
Summary**

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Pol. (H/V)	Azimuth (°)	Height (m)	Comments
BT-LE(1Mbps)	-	-	-	-	-	-	-	-	-	-	-	-
2.4-2.4835GHz	Pass	AV	2.5G	47.41	54.00	-6.59	32.50	3	V	161	1.50	-

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


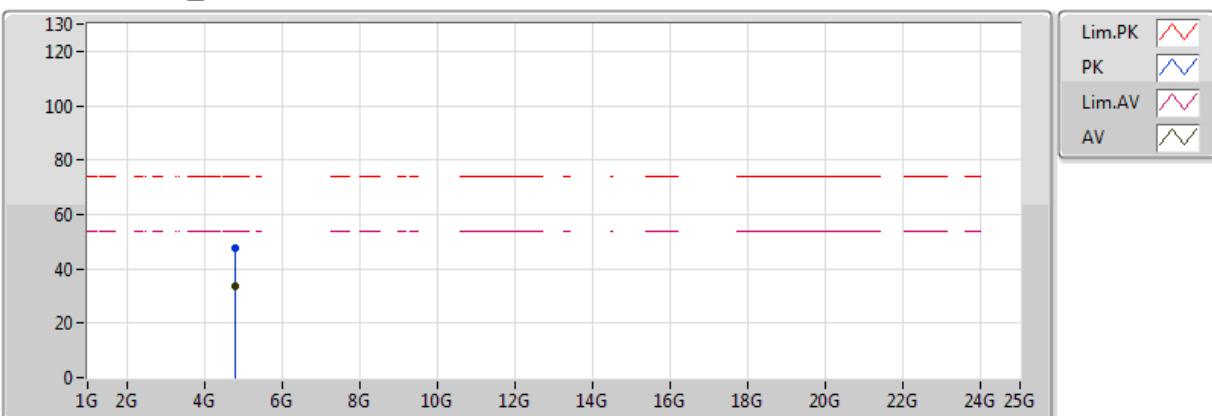
20171128  
 EUT Z\_1TX  
 Setting Default  
 02-C-5  
 FSU

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	2.3894G	46.78	54.00	-7.22	32.14	3	V	49	2.73	-
AV	2.402G	72.32	Inf	-Inf	32.18	3	V	49	2.73	-
PK	2.3778G	59.41	74.00	-14.59	32.10	3	V	49	2.73	-
PK	2.4022G	89.01	Inf	-Inf	32.18	3	V	49	2.73	-

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

20171128  
EUT\_Z\_1TX  
Setting Default  
02-C-5  
FSU

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	2.3896G	46.77	54.00	-7.23	32.14	3	H	136	2.63	-
AV	2.402G	75.13	Inf	-Inf	32.18	3	H	136	2.63	-
PK	2.3718G	59.37	74.00	-14.63	32.09	3	H	136	2.63	-
PK	2.4022G	93.36	Inf	-Inf	32.18	3	H	136	2.63	-

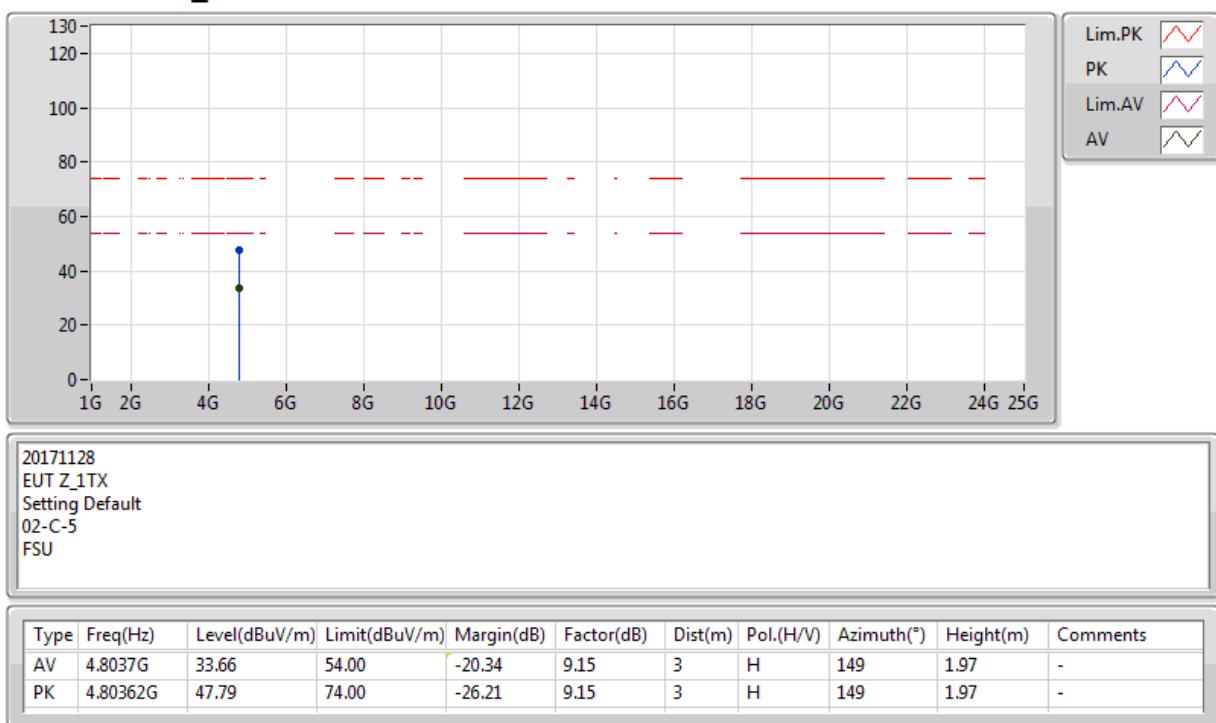
**BT-LE(1Mbps)****2402MHz\_TX**

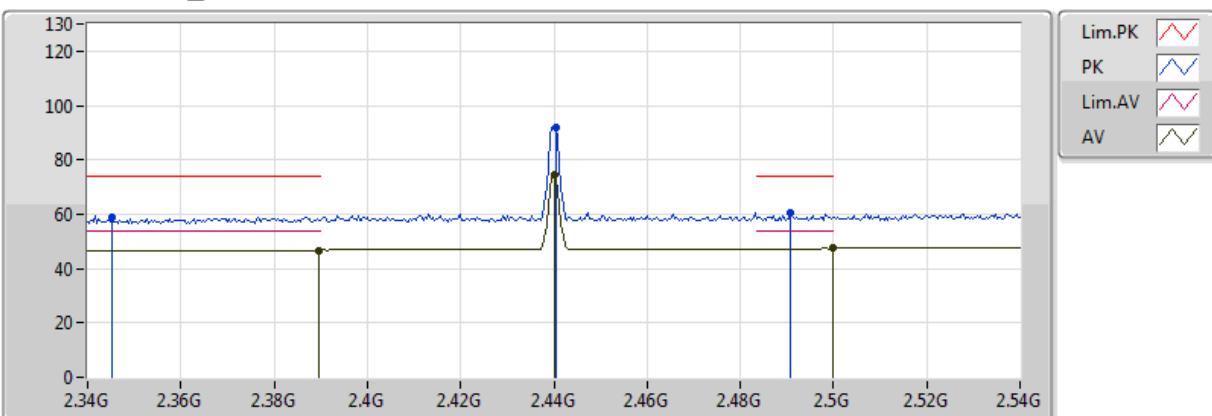
20171128  
EUT Z\_1TX  
Setting Default  
02-C-5  
FSU

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	4.80358G	33.44	54.00	-20.56	9.15	3	V	18	1.92	-
PK	4.80438G	47.67	74.00	-26.33	9.15	3	V	18	1.92	-

### **BT-LE(1Mbps)**

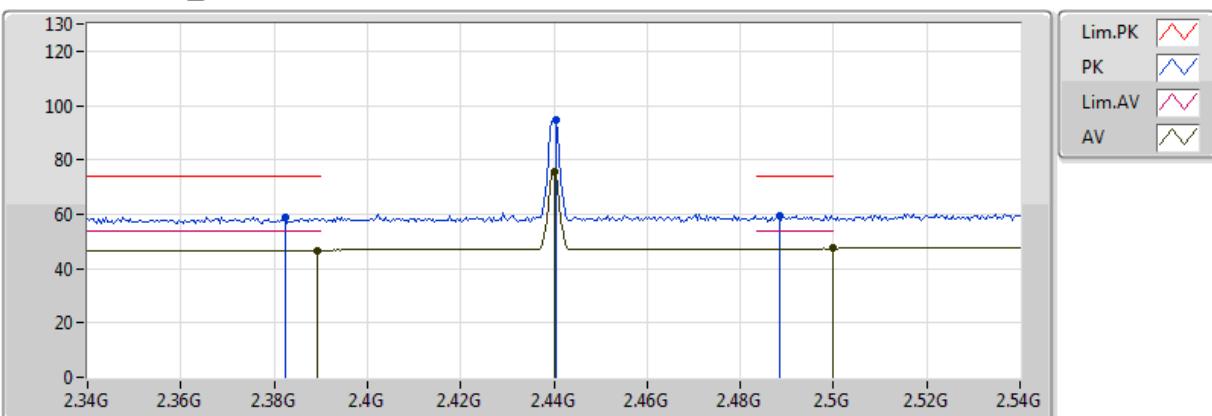
#### **2402MHz\_TX**



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


20171128  
 EUT Z\_1TX  
 Setting Default  
 02-C-5  
 FSU

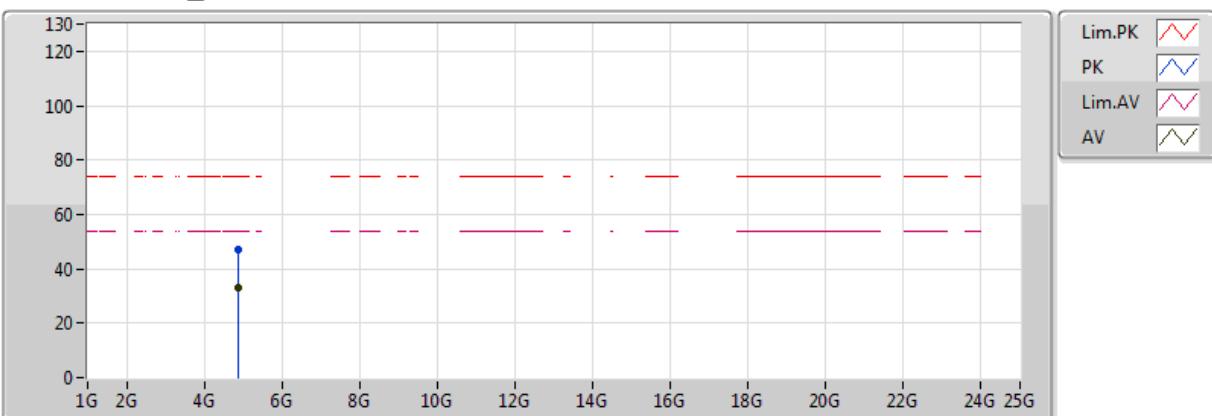
Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	2.3896G	46.77	54.00	-7.23	32.14	3	V	161	1.50	-
AV	2.44G	74.39	Inf	-Inf	32.30	3	V	161	1.50	-
AV	2.5G	47.41	54.00	-6.59	32.50	3	V	161	1.50	-
PK	2.3452G	58.69	74.00	-15.31	32.01	3	V	161	1.50	-
PK	2.4404G	92.11	Inf	-Inf	32.30	3	V	161	1.50	-
PK	2.4908G	60.44	74.00	-13.56	32.47	3	V	161	1.50	-

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


20171128  
 EUT Z\_1TX  
 Setting Default  
 02-C-5  
 FSU

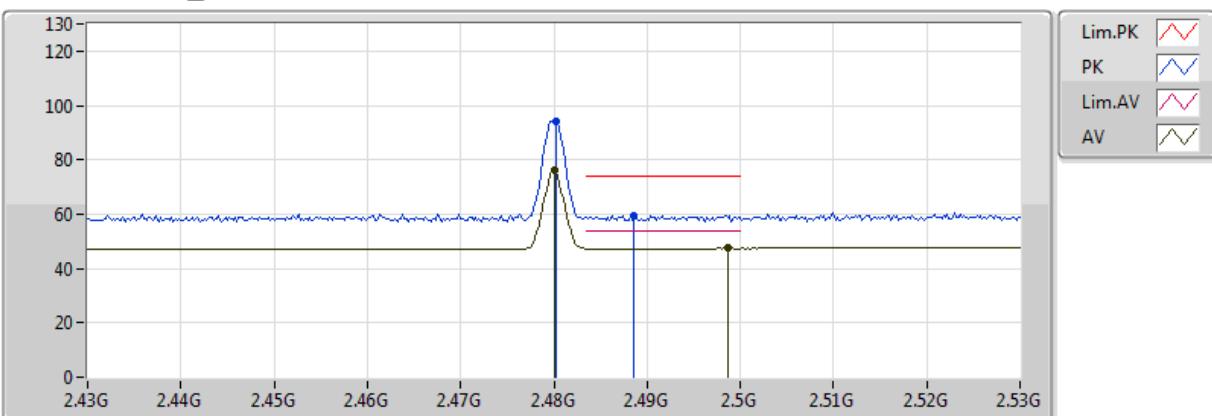
Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	2.3892G	46.78	54.00	-7.22	32.14	3	H	332	2.12	-
AV	2.44G	75.87	Inf	-Inf	32.30	3	H	332	2.12	-
AV	2.5G	47.36	54.00	-6.64	32.50	3	H	332	2.12	-
PK	2.3824G	58.85	74.00	-15.15	32.12	3	H	332	2.12	-
PK	2.4404G	94.44	Inf	-Inf	32.30	3	H	332	2.12	-
PK	2.4884G	59.39	74.00	-14.61	32.46	3	H	332	2.12	-

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

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

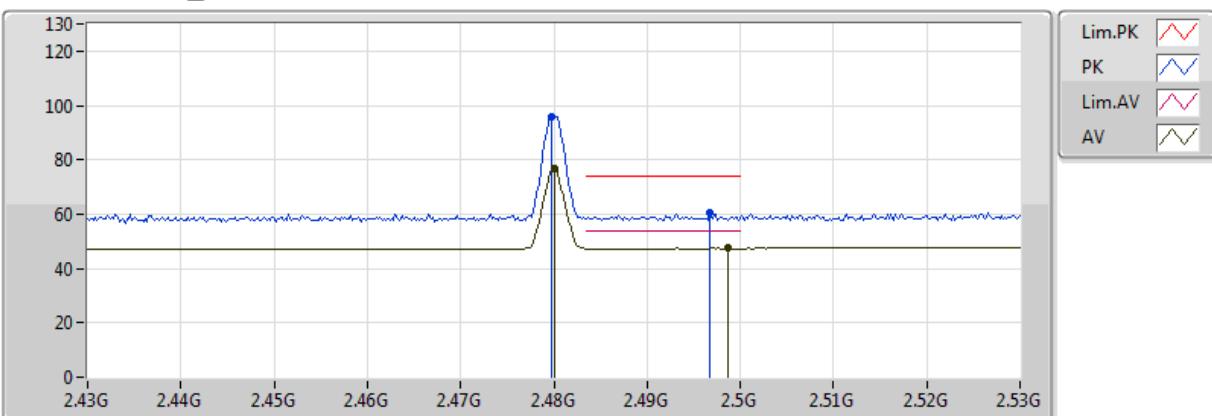
20171128  
EUT Z\_1TX  
Setting Default  
02-C-5  
FSU

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	4.88028G	32.96	54.00	-21.04	9.30	3	H	120	2.36	-
PK	4.88028G	46.85	74.00	-27.15	9.30	3	H	120	2.36	-

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


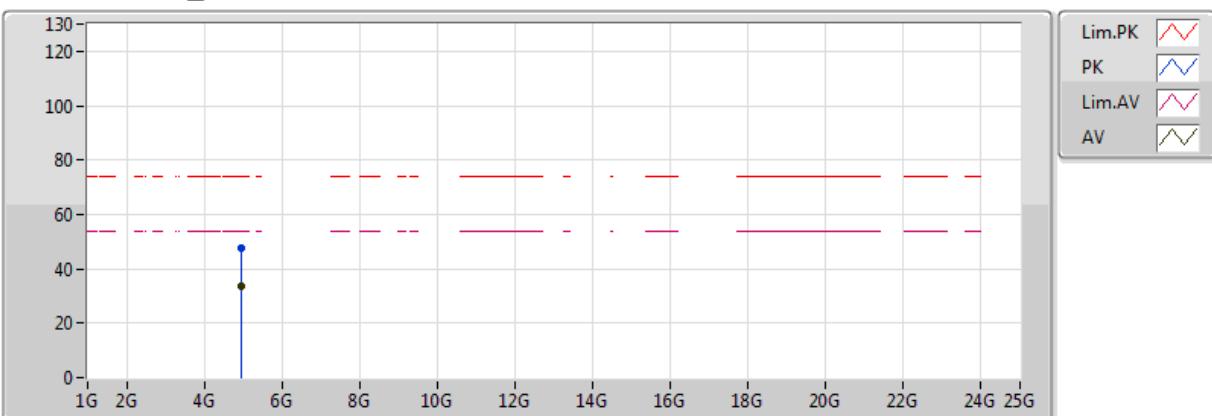
20171128  
 EUT Z\_1TX  
 Setting Default  
 02-C-5  
 FSU

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	2.48G	75.94	Inf	-Inf	32.43	3	V	142	1.49	-
AV	2.4986G	47.37	54.00	-6.63	32.50	3	V	142	1.49	-
PK	2.4802G	94.40	Inf	-Inf	32.43	3	V	142	1.49	-
PK	2.4886G	59.67	74.00	-14.33	32.46	3	V	142	1.49	-

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


20171128  
 EUT Z\_1TX  
 Setting Default  
 02-C-5  
 FSU

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	2.48G	76.84	Inf	-Inf	32.43	3	H	184	1.52	-
AV	2.4986G	47.36	54.00	-6.64	32.50	3	H	184	1.52	-
PK	2.4798G	95.83	Inf	-Inf	32.43	3	H	184	1.52	-
PK	2.4968G	60.76	74.00	-13.24	32.49	3	H	184	1.52	-

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

20171128  
EUT Z\_1TX  
Setting Default  
02-C-5  
FSU

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	4.95522G	33.38	54.00	-20.62	9.44	3	V	298	1.50	-
PK	4.9572G	47.82	74.00	-26.18	9.44	3	V	298	1.50	-

### **BT-LE(1Mbps)**

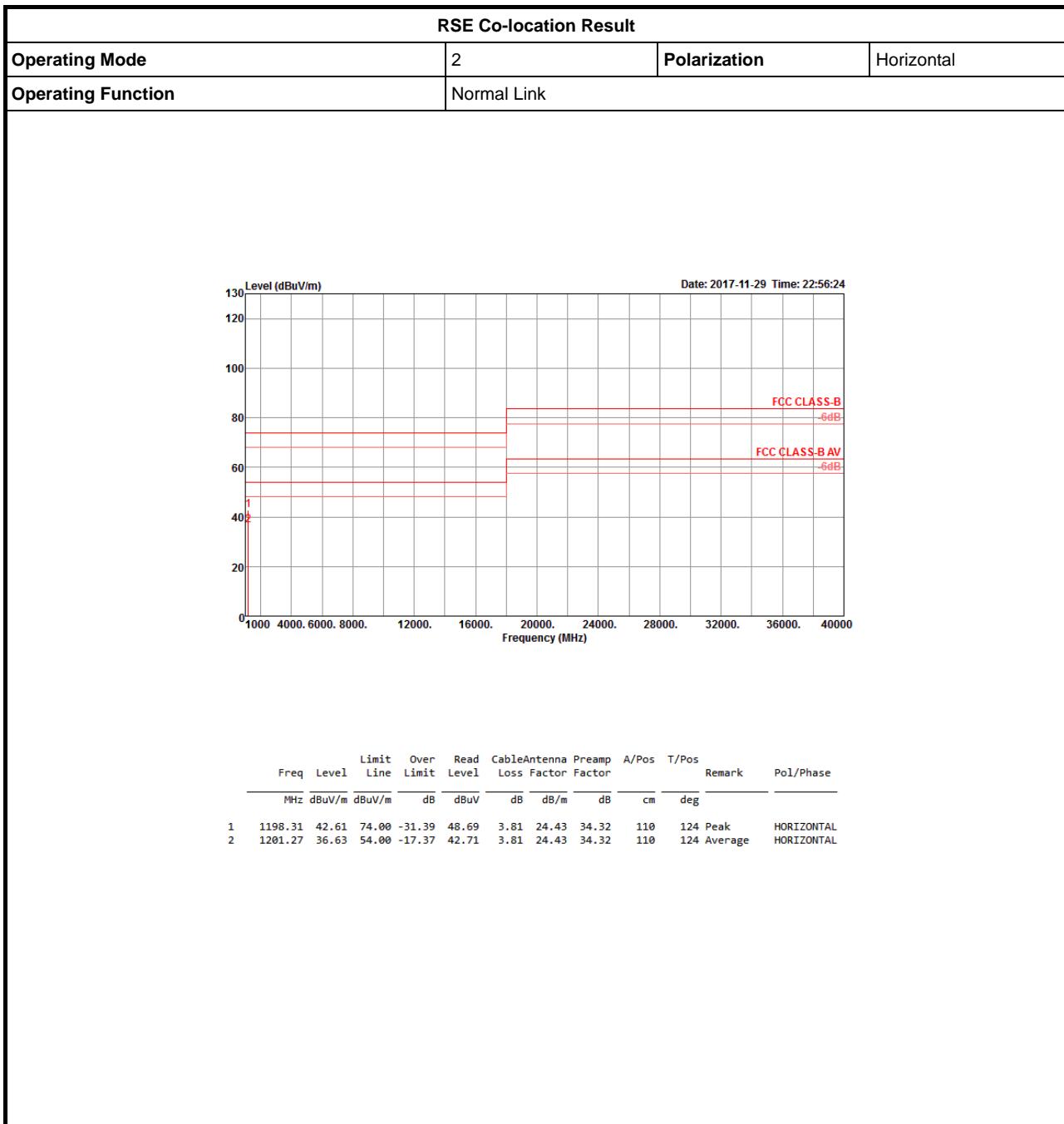
#### **2480MHz\_TX**





## RSE Co-location Result

## Appendix D





## RSE Co-location Result

Appendix D





## RSE Co-location Result

## Appendix D





## RSE Co-location Result

Appendix D

