

# FCC Test Report

**FCC ID** : SWX-UAPIWHD  
**Equipment** : UniFi HD IN-WALL  
**Brand Name** : UBIQUITI  
**Model Name** : UAP-IW-HD  
**Applicant / Manufacturer** : Ubiquiti Networks, Inc.  
685 Third Avenue, 27th Floor New York,  
New York 10017 USA  
**Standard** : 47 CFR FCC Part 15.247

The product was received on Oct. 30, 2017, and testing was started from Mar. 20, 2018 and completed on Mar. 30, 2018. We, SPORTON INTERTIONAL 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 INTERTIONAL INC. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.



Approved by: Allen Lin

**SPORTON INTERTIONAL INC. EMC & Wireless Communications Laboratory**

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



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### Summary of Test Result

Report Clause	Ref. Std. Clause	Test Items	Result (PASS/FAIL)	Remark
0	15.203	Antenna Requirement	PASS	FCC 15.203
3.1	15.207	AC Power-line Conducted Emissions	PASS	FCC 15.207
3.2	15.247(a)	DTS Bandwidth	PASS	≥500kHz
3.3	15.247(b)	Maximum Conducted Output Power	PASS	Power [dBm]:30
3.4	15.247(e)	Power Spectral Density	PASS	PSD [dBm/3kHz]:8
3.5	15.247(d)	Emissions in Non-restricted Frequency Bands	PASS	Non-Restricted Bands: >30 dBc
3.6	15.247(d)	Emissions in Restricted Frequency Bands	PASS	Restricted Bands: FCC 15.209

Reviewed by: Sam Tsai

Report Producer: Ivy Yuan



# 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)	1.0	1TX

Note:

- ♦ Bluetooth LE uses a GFSK (1Mbps) modulation for DSSS.
- ♦ BWch is the nominal channel bandwidth.



1.1.2 Antenna Information

Ant.	Port	Brand	Model Name	Antenna Type	Connector
1	1	-	-	internal antenna	Murata
2	2	-	-	internal antenna	i-Pex
3	3	-	-	internal antenna	i-Pex
4	4	-	-	internal antenna	i-Pex
5	1	-	-	internal antenna	fixed on board

Ant.	Port	Gain (dBi)		
		2.4G	5G	BT
1	1	1.8	4	-
2	2			
3	3	-	4	-
4	4			
5	1	-	-	1.4

Note 1: The EUT has three antennas.

**For 2.4GHz function:**

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

Ant. 1 and Ant. 2 can be used as transmitting/receiving antenna.

**For 5GHz function:**

For IEEE 802.11a/n/ac mode (4TX/4RX):

Ant. 1 & Ant. 2 & Ant. 3 and Ant. 4 can be used as transmitting/receiving antenna.

**For Bluetooth function:**

For Bluetooth mode (1TX/1RX)

Only Ant. 5 can be used as transmitting/receiving antenna.



1.1.3 EUT Information

Operational Condition	
EUT Power Type	From PoE
Type of EUT	
<input checked="" type="checkbox"/>	Stand-alone
<input type="checkbox"/>	Combined (EUT where the radio part is fully integrated within another device)
	Combined Equipment - Brand Name / Model No.: ...
<input type="checkbox"/>	Plug-in radio (EUT intended for a variety of host systems)
	Host System - Brand Name / Model No.: ...
<input type="checkbox"/>	Other:

1.1.4 Mode Test Duty Cycle

Mode	DC	DCF(dB)	T(s)	VBW(Hz) ≥ 1/T
BT-LE(1Mbps)	0.621	2.069	404.375u	3k



### 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
- ◆ KDB 558074 D01 v04

### 1.3 Testing Location Information

Testing Location		
<input checked="" 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
Test site Designation No. TW1190 with FCC.		
<input type="checkbox"/>	JHUBEI	ADD : No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County, Taiwan (R.O.C.) TEL : 886-3-656-9065 FAX : 886-3-656-9085
Test site Designation No. TW0006 with FCC.		

Test Condition	Test Site No.	Test Engineer	Test Environment	Test Date
RF Conducted	TH01-HY	Tim	22.5°C / 65%	21/Mar/2018
Radiated	03CH03-HY	Jeff	25°C / 59%	24/Mar/2018
AC Conduction	CO04-HY	Jeff	25°C / 59%	30/Mar/2018

### 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)	3.6 dB	Confidence levels of 95%
Radiated Emission (9kHz ~ 30MHz)	3.0 dB	Confidence levels of 95%
Radiated Emission (30MHz ~ 1,000MHz)	4.3 dB	Confidence levels of 95%
Radiated Emission (1GHz ~ 18GHz)	3.9 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	3.5 dB	Confidence levels of 95%
Conducted Emission	1.3 dB	Confidence levels of 95%
Temperature	0.7 °C	Confidence levels of 95%
Humidity	4 %	Confidence levels of 95%





## 2 Test Configuration of EUT

### 2.1 Test Condition

Condition Item	Abbreviation/Remark	Remark
RF Conducted-DTS	Abbreviation	Remark
TnomVnom	Tnom	20°C
	Vnom	120V




### 2.2 Test Channel Mode

Test Software	Dos
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### 2.3 The Worst Case Measurement Configuration

The Worst Case Mode for Following Conformance Tests	
Tests Item	AC power-line conducted emissions
Condition	AC power-line conducted measurement for line and neutral
Operating Mode	CTX
1	PoE mode

The Worst Case Mode for Following Conformance Tests	
Tests Item	DTS Bandwidth Maximum Conducted Output Power Power Spectral Density Emissions in Non-restricted Frequency Bands
Test Condition	Conducted measurement at transmit chains

The Worst Case Mode for Following Conformance Tests			
Tests Item	Emissions in Restricted Frequency Bands		
Test Condition	Radiated measurement If EUT consist of multiple antenna assembly (multiple antenna are used in EUT regardless of spatial multiplexing MIMO configuration), the radiated test should be performed with highest antenna gain of each antenna type.		
Operating Mode < 1GHz	CTX		
1	PoE mode		
Operating Mode > 1GHz	CTX		
Orthogonal Planes of EUT	X Plane	Y Plane	Z Plane
			
Worst Planes of EUT			V



## 2.4 Support Equipment

<b>Support Equipment – RF Conducted</b>				
<b>No.</b>	<b>Equipment</b>	<b>Brand Name</b>	<b>Model Name</b>	<b>FCC ID</b>
1	Notebook	DELL	E5410	R33002 / DOC
2	Adapter for NB	DELL	HA65NM130	R35737 / DOC
3	Notebook	DELL	E5410	R33002 / DOC
4	Adapter for NB	DELL	HA65NM130	R35737 / DOC
5	AC Source	GW	APS-9102	-
6	PoE for EUT	CERIO	POE-S48G	-
7	Client	UBNT	UAP-HD-Nano_Tier 1	-
8	PoE for client	UBNT	GP-H480-050G	-

Note. Support equipment No.7 was provided by customer.

<b>Support Equipment – Radiated Emission</b>				
<b>No.</b>	<b>Equipment</b>	<b>Brand Name</b>	<b>Model Name</b>	<b>FCC ID</b>
1	PoE for EUT	CERIO	POE-S48G	-
2	PoE for client	CERIO	POE-S48G	-
3	client	UBNT	UAP-HD-Nano_Tier 1	-
4	AC adapter for PoE	EDACPOWER	EA10681E-520	-

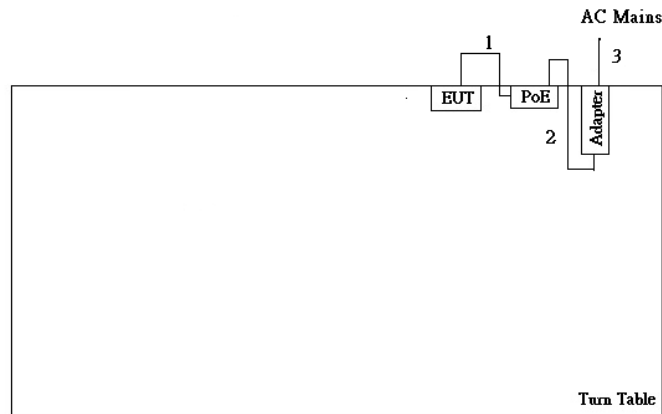
Note. Support equipment No.3 was provided by customer.

<b>Support Equipment – AC Conduction</b>				
<b>No.</b>	<b>Equipment</b>	<b>Brand Name</b>	<b>Model Name</b>	<b>FCC ID</b>
1	PoE for EUT	CERIO	POE-S48G	-
2	PoE for client	CERIO	POE-S48G	-
3	client	UBNT	UAP-HD-Nano_Tier 1	-
4	Notebook	Dell	E4300	-
5	AC adapter for PoE	EDACPOWER	EA10681E-520	-

Note. Support equipment No.3 was provided by customer.

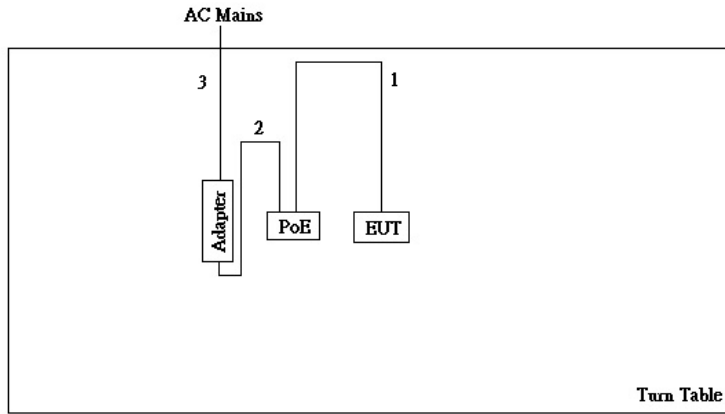
## 2.5 Test Setup Diagram

Test Setup Diagram – AC Line Conducted Emission Test



Item	Connection	Shielded	Length(m)	Remark
1	RJ-45 Cable	No	1m	-
2	DC power line	No	1m	-
3	AC power line	No	1.5m	-

**Test Setup Diagram - Radiated Test**



Item	Connection	Shielded	Length(m)	Remark
1	RJ-45 Cable	No	1m	-
2	DC power line	No	1m	-
3	AC power line	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.

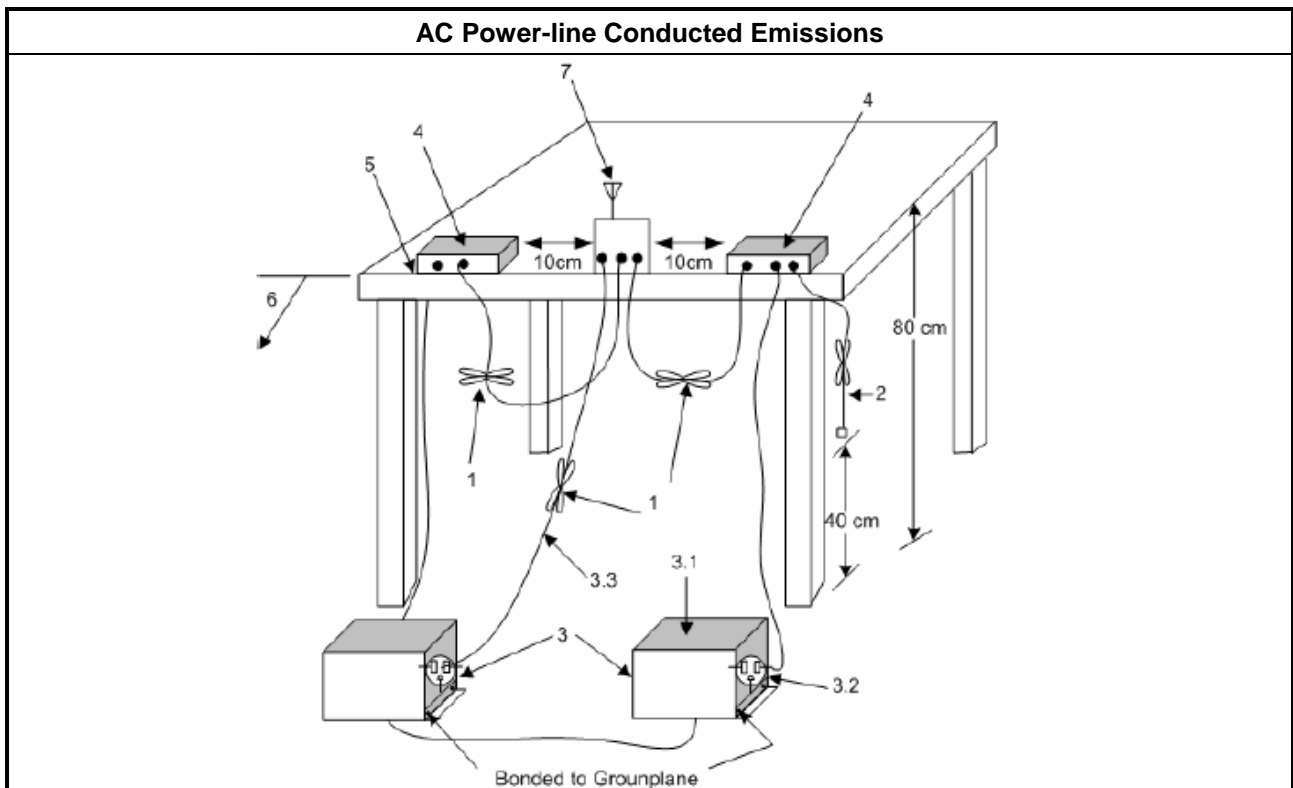
##### 3.1.2 Measuring Instruments

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

##### 3.1.3 Test Procedures

Test Method
<ul style="list-style-type: none"> <li>Refer as ANSI C63.10-2013, clause 6.2 foray power-line conducted emissions.</li> </ul>

##### 3.1.4 Test Setup



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

Refer as Appendix A

### 3.2 DTS Bandwidth

#### 3.2.1 6dB Bandwidth Limit

6dB Bandwidth Limit
<b>Systems using digital modulation techniques:</b>
<ul style="list-style-type: none"> <li>▪ 6 dB bandwidth <math>\geq</math> 500 kHz.</li> </ul>

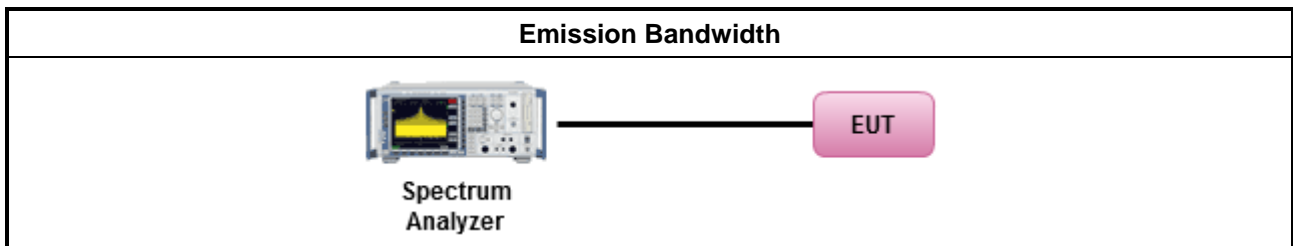
#### 3.2.2 Measuring Instruments

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

#### 3.2.3 Test Procedures

Test Method	
<ul style="list-style-type: none"> <li>▪ For the emission bandwidth shall be measured using one of the options below:</li> </ul>	
<input checked="" type="checkbox"/>	Refer as KDB 558074, clause 8.1 Option 1 for 6 dB bandwidth measurement.
<input type="checkbox"/>	Refer as KDB 558074, clause 8.2 Option 2 for 6 dB bandwidth measurement.
<input type="checkbox"/>	Refer as ANSI C63.10, clause 6.9.3 for occupied bandwidth testing.
<input type="checkbox"/>	Refer as RSS-Gen, clause 6.6 for occupied bandwidth testing.

#### 3.2.4 Test Setup



#### 3.2.5 Test Result of Emission Bandwidth

Refer as Appendix B

### 3.3 Maximum Conducted Output Power

#### 3.3.1 Maximum Conducted Output Power Limit

Maximum Conducted Output Power Limit	
	<ul style="list-style-type: none"> <li>▪ If <math>G_{TX} \leq 6</math> dBi, then <math>P_{Out} \leq 30</math> dBm (1 W)</li> </ul>
	<ul style="list-style-type: none"> <li>▪ Point-to-multipoint systems (P2M): If <math>G_{TX} &gt; 6</math> dBi, then <math>P_{Out} = 30 - (G_{TX} - 6)</math> dBm</li> </ul>
	<ul style="list-style-type: none"> <li>▪ Point-to-point systems (P2P): If <math>G_{TX} &gt; 6</math> dBi, then <math>P_{Out} = 30 - (G_{TX} - 6)/3</math> dBm</li> </ul>
	<ul style="list-style-type: none"> <li>▪ Smart antenna system (SAS):</li> </ul>
	<ul style="list-style-type: none"> <li>- Single beam: If <math>G_{TX} &gt; 6</math> dBi, then <math>P_{Out} = 30 - (G_{TX} - 6)/3</math> dBm</li> </ul>
	<ul style="list-style-type: none"> <li>- Overlap beam: If <math>G_{TX} &gt; 6</math> dBi, then <math>P_{Out} = 30 - (G_{TX} - 6)/3</math> dBm</li> </ul>
	<ul style="list-style-type: none"> <li>- Aggregate power on all beams: If <math>G_{TX} &gt; 6</math> dBi, then <math>P_{Out} = 30 - (G_{TX} - 6)/3 + 8</math> dB dBm</li> </ul>
e.i.r.p. Power Limit:	
	<ul style="list-style-type: none"> <li>▪ 2400-2483.5 MHz Band</li> </ul>
	<ul style="list-style-type: none"> <li>▪ Point-to-multipoint systems (P2M): <math>P_{eirp} \leq 36</math> dBm (4 W)</li> </ul>
	<ul style="list-style-type: none"> <li>▪ Point-to-point systems (P2P): <math>P_{eirp} \leq \text{MAX}(36, [P_{Out} + G_{TX}])</math> dBm</li> </ul>
	<ul style="list-style-type: none"> <li>▪ Smart antenna system (SAS)</li> </ul>
	<ul style="list-style-type: none"> <li>- Single beam: <math>P_{eirp} \leq \text{MAX}(36, P_{Out} + G_{TX})</math> dBm</li> </ul>
	<ul style="list-style-type: none"> <li>- Overlap beam: <math>P_{eirp} \leq \text{MAX}(36, P_{Out} + G_{TX})</math> dBm</li> </ul>
	<ul style="list-style-type: none"> <li>- Aggregate power on all beams: <math>P_{eirp} \leq \text{MAX}(36, [P_{Out} + G_{TX} + 8])</math> dBm</li> </ul>
<p><math>P_{Out}</math> = maximum peak conducted output power or maximum conducted output power in dBm,  <math>G_{TX}</math> = the maximum transmitting antenna directional gain in dBi.</p>	

#### 3.3.2 Measuring Instruments

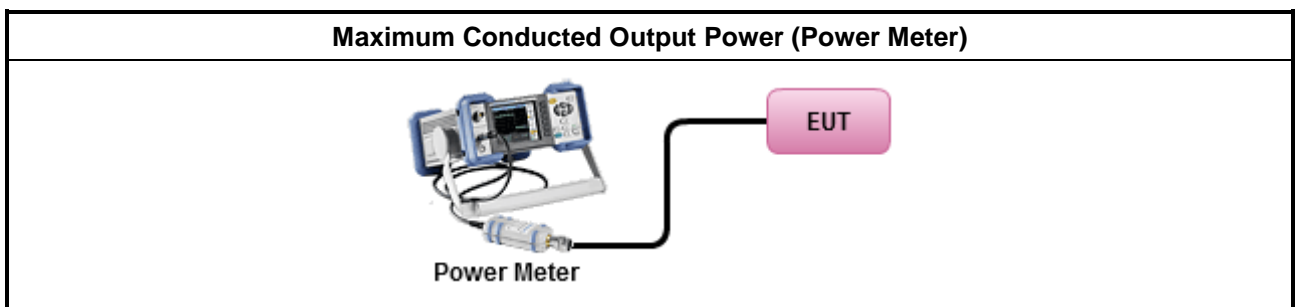
Refer a test equipment and calibration data table in this test report.



### 3.3.3 Test Procedures

Test Method	
<ul style="list-style-type: none"> <li>▪ Maximum Peak Conducted Output Power</li> </ul>	
<input type="checkbox"/>	Refer as KDB 558074, clause 9.1.1 Option 1 (RBW ≥ EBW method).
<input type="checkbox"/>	Refer as KDB 558074, clause 9.1.2 Option 2 (integrated band power method)
<input type="checkbox"/>	Refer as KDB 558074, clause 9.1.3 Option 3 (peak power meter for VBW ≥ DTS BW)
<ul style="list-style-type: none"> <li>▪ Maximum Average Conducted Output Power</li> </ul>	
Duty cycle ≥ 98%	
<input type="checkbox"/>	Refer as KDB 558074, clause 9.2.2.4 Method AVGSA-2 (spectral trace averaging).
Duty cycle < 98%	
<input type="checkbox"/>	Refer as KDB 558074, clause 9.2.2.5 Method AVGSA-2 Alt. (slow sweep speed)
RF power meter and average over on/off periods with duty factor or gated trigger	
<input checked="" type="checkbox"/>	Refer as KDB 558074, clause 9.2.3.1 Method AVGPM (using an RF average power meter).
<ul style="list-style-type: none"> <li>▪ For conducted measurement.</li> </ul>	
<ul style="list-style-type: none"> <li>▪ If the EUT supports multiple transmit chains using options given below: Refer as KDB 662911, In-band power measurements. Using the measure-and-sum approach, measured all transmit ports individually. Sum the power (in linear power units e.g., mW) of all ports for each individual sample and save them.</li> </ul>	
<ul style="list-style-type: none"> <li>▪ If multiple transmit chains, EIRP calculation could be following as methods:  <math>P_{total} = P_1 + P_2 + \dots + P_n</math>                      (calculated in linear unit [mW] and transfer to log unit [dBm])  <math>EIRP_{total} = P_{total} + DG</math> </li> </ul>	

### 3.3.4 Test Setup



### 3.3.5 Test Result of Maximum Conducted Output Power

Refer as Appendix C

### 3.4 Power Spectral Density

#### 3.4.1 Power Spectral Density Limit

Power Spectral Density Limit
<ul style="list-style-type: none"> <li>Power Spectral Density (PSD) ≤ 8 dBm/3kHz</li> </ul>

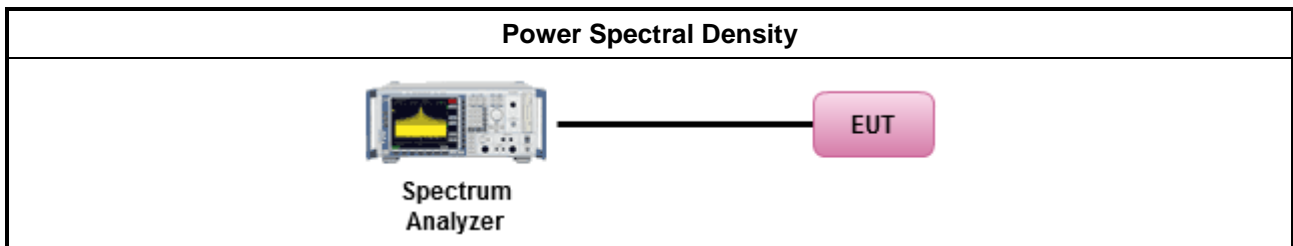
#### 3.4.2 Measuring Instruments

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

#### 3.4.3 Test Procedures

Test Method
<ul style="list-style-type: none"> <li>Peak power spectral density procedures that the same method as used to determine the conducted output power. If maximum peak conducted output power was measured to demonstrate compliance to the output power limit, then the peak PSD procedure below (Method PKPSD) shall be used. If maximum conducted output power was measured to demonstrate compliance to the output power limit, then one of the average PSD procedures shall be used, as applicable based on the following criteria (the peak PSD procedure is also an acceptable option).</li> </ul>
<input checked="" type="checkbox"/> Refer as KDB 558074, clause 10.2 Method PKPSD (RBW=3-100kHz; Detector=peak).
<ul style="list-style-type: none"> <li>For conducted measurement.</li> </ul>
<ul style="list-style-type: none"> <li>If The EUT supports multiple transmit chains using options given below:             <ul style="list-style-type: none"> <li>Measure and sum the spectra across the outputs. Refer as KDB 662911, In-band power spectral density (PSD). Sample all transmit ports simultaneously using a spectrum analyzer for each transmit port. Where the trace bin-by-bin of each transmit port summing can be performed. (i.e., in the first spectral bin of output 1 is summed with that in the first spectral bin of output 2 and that from the first spectral bin of output 3, and so on up to the NTX output to obtain the value for the first frequency bin of the summed spectrum.). Add up the amplitude (power) values for the different transmit chains and use this as the new data trace.</li> </ul> </li> </ul>

#### 3.4.4 Test Setup



#### 3.4.5 Test Result of Power Spectral Density

Refer as Appendix D

### 3.5 Emissions in Non-restricted Frequency Bands

#### 3.5.1 Emissions in Non-restricted Frequency Bands Limit

Un-restricted Band Emissions Limit	
RF output power procedure	Limit (dB)
Peak output power procedure	20
Average output power procedure	30

Note 1: If the peak output power procedure is used to measure the fundamental emission power to demonstrate compliance to requirements, then the peak conducted output power measured within any 100 kHz outside the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum measured in-band peak PSD level.

Note 2: If the average output power procedure is used to measure the fundamental emission power to demonstrate compliance to requirements, then the power in any 100 kHz outside of the authorized frequency band shall be attenuated by at least 30 dB relative to the maximum measured in-band average PSD level.

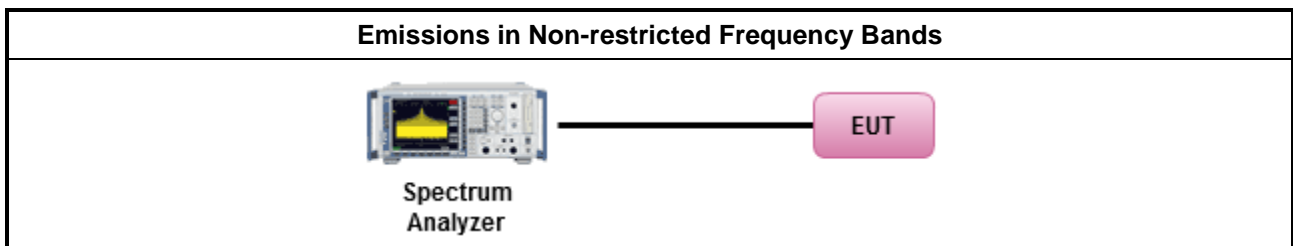
#### 3.5.2 Measuring Instruments

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

#### 3.5.3 Test Procedures

Test Method
<ul style="list-style-type: none"> <li>Refer as KDB 558074, clause 11 for unwanted emissions into non-restricted bands.</li> </ul>

#### 3.5.4 Test Setup



#### 3.5.5 Test Result of Emissions in Non-restricted Frequency Bands

Refer as Appendix E



### 3.6 Emissions in Restricted Frequency Bands

#### 3.6.1 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.

#### 3.6.2 Measuring Instruments

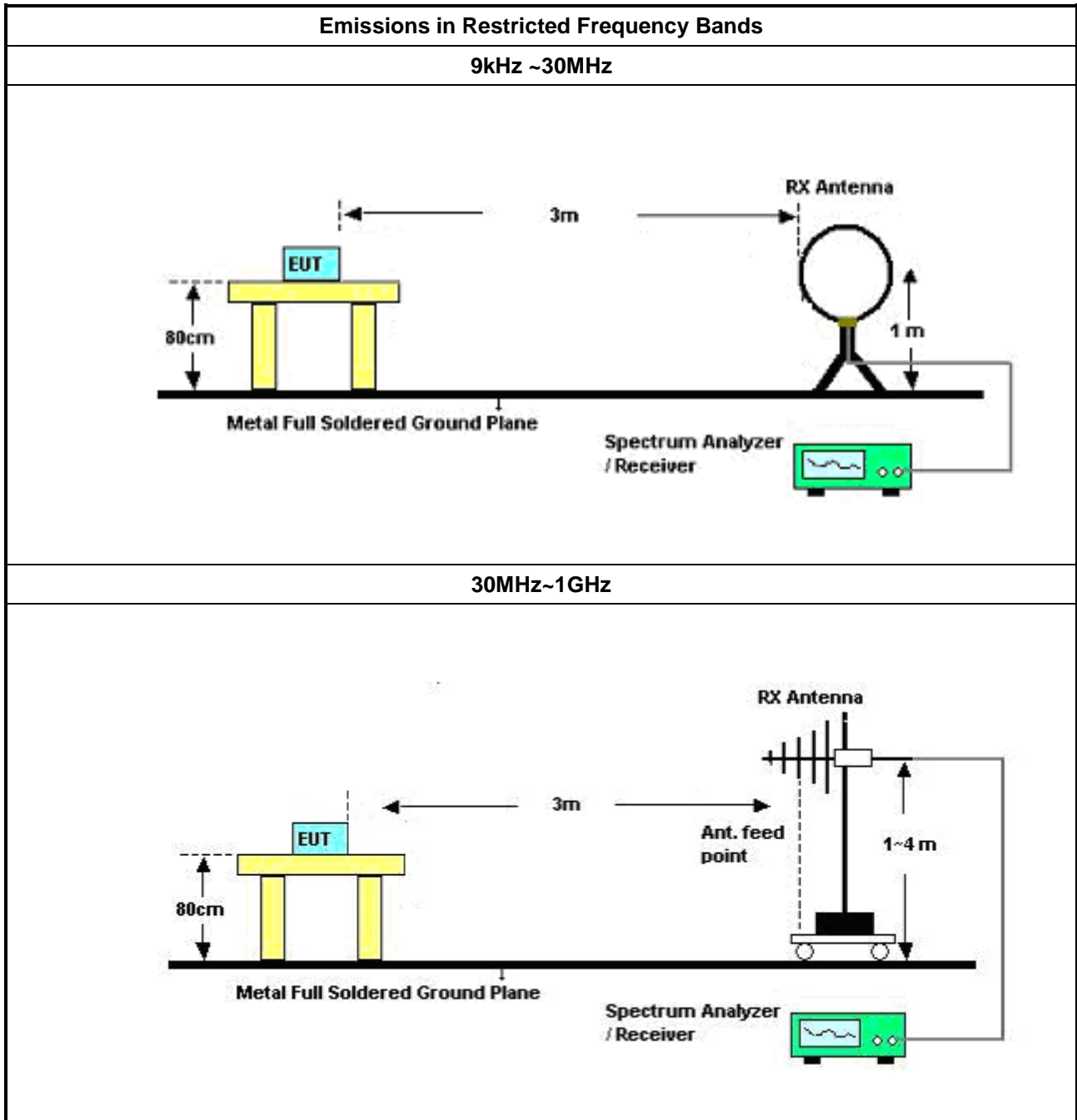
Refer a test equipment and calibration data table in this test report.

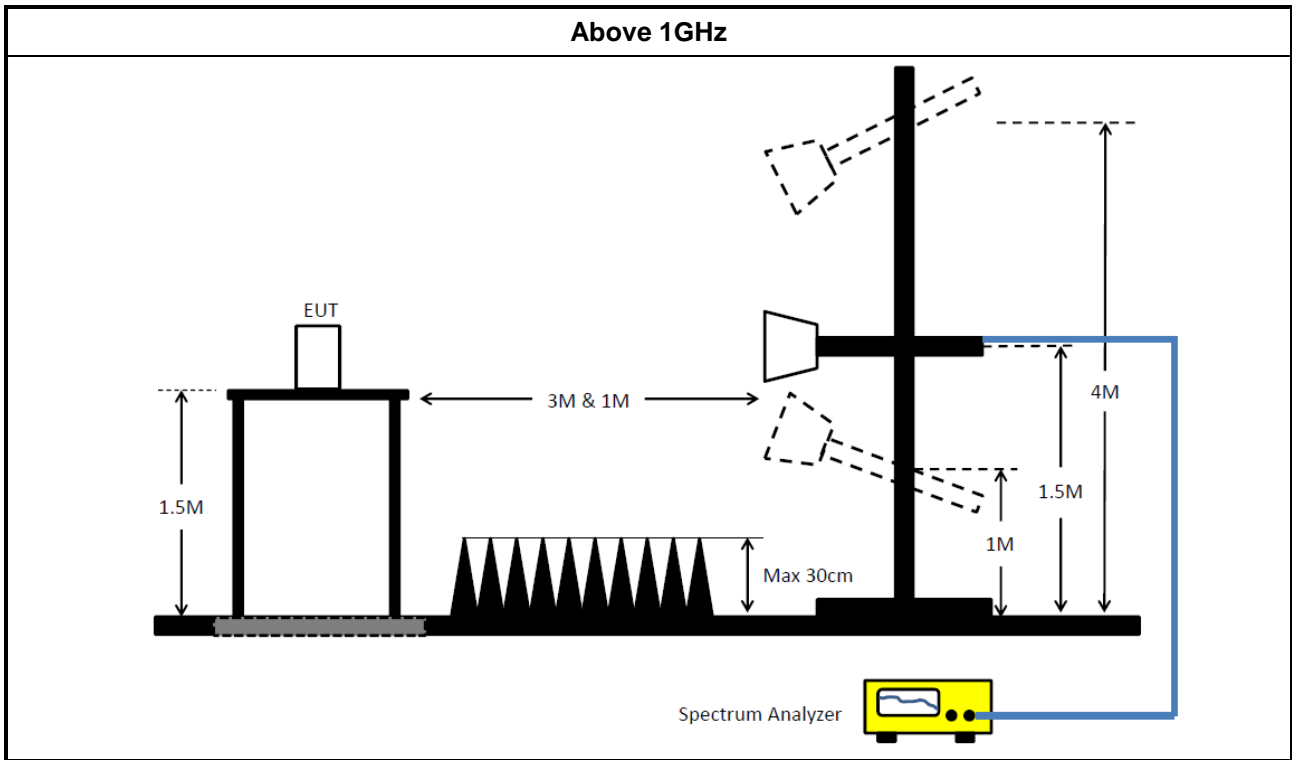


3.6.3 Test Procedures

Test Method	
<ul style="list-style-type: none"> <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 6.10.3 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 KDB 558074, clause 12 for unwanted emissions into restricted bands.</li> </ul>	
<ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Refer as KDB 558074, clause 12.2.5.3 (ANSI C63.10, clause 4.1.4.2.3), Reduced VBW<math>\geq</math>1/T.</li> </ul>	
<ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Refer as KDB 558074, clause 12.2.4 measurement procedure peak limit.</li> </ul>	
<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 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 KDB 558074, clause 13.2 (ANSI C63.10, clause 6.10.6) for marker-delta method for band-edge measurements.</li> </ul>	
<ul style="list-style-type: none"> <li>Refer as 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 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: (1) Measure and sum the spectra across the outputs or (2) Measure and add 10 log(N) dB</li> </ul>	
<ul style="list-style-type: none"> <li>For 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>	

### 3.6.4 Test Setup





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

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

### 3.6.6 Test Result of Emissions in Restricted Frequency Bands

Refer as Appendix F



## 4 Test Equipment and Calibration Data

### Instrument for AC Conduction

Instrument	Manufacturer	Model No.	Serial No.	Spec.	Calibration Date	Calibration Due Date
EMC Receiver	R&S	ESR3	102052	9KHz ~ 3.6GHz	29/Apr/2017	28/Apr/2018
LISN	R&S	ENV216	101295	9kHz ~ 30MHz	17/Nov/2017	16/Nov/2018
RF Cable-CON	HUBER+SUHNER	RG213/U	07611832020001	9kHz ~ 30MHz	06/Oct/2017	05/Oct/2018
AC POWER	APC	AFC-11005G	F310050055	47Hz~63Hz 5~300V	NCR	NCR
Impuls Begrenzer Pulse Limiter	SCHWARZBECK	VTSD 9561-F	9561-F041	9 kHz ~ 30 MHz	12/Oct/2017	11/Oct/2018

NCR : Non-Calibration Require

### Instrument for Radiated Test

Instrument	Manufacturer	Model No.	Serial No.	Spec.	Calibration Date	Calibration Due Date
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	30MHz ~ 1GHz 3m	31/Oct/2017	30/Oct/2018
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	1GHz ~ 18GHz 3m	01/Nov/2017	31/Oct/2018
Amplifier	HP	8447D	2944A08033	10kHz ~ 1.3GHz	19/Apr/2017	18/Apr/2018
Amplifier	Keysight	83017A	MY53270196	1GHz ~ 26.5GHz	31/Aug/2017	30/Aug/2018
Spectrum	R&S	FSV40	101500	9kHz ~ 40GHz	28/Jun/2017	27/Jun/2018
Receiver	R&S	ESR3	102052	9KHz ~ 3.6GHz	29/Apr/2017	28/Apr/2018
RF Cable-R03m	Jye Bao	RG142	CB021	9kHz ~ 1GHz	26/Jan/2018	25/Jan/2019
RF Cable-high	SUHNER	SUCOFLEX106	CB222	1GHz ~ 40GHz	26/Jan/2018	25/Jan/2019
Bilog Antenna	SCHAFFNER	CBL 6112B	22237	30MHz ~ 1GHz	08/Jul/2017	07/Jul/2018
Horn Antenna	SCHWARZBECK	BBHA9170	BBHA9170154	18GHz ~ 40GHz	09/Feb/ 2018	08/Feb/2019
Horn Antenna	SCHWARZBECK	BBHA9120D	1531	1GHz ~ 18GHz	25/Apr/ 2017	24/Apr/2018
Amplifier	MITEQ	TTA1840-35-HG	1864481	18GHz ~ 40GHz	24/Aug/2017	23/Aug/2018
Loop Antenna	TESEQ	HLA 6120	31244	9 kHz~30 MHz	16/Mar/2018	15/Mar/2019





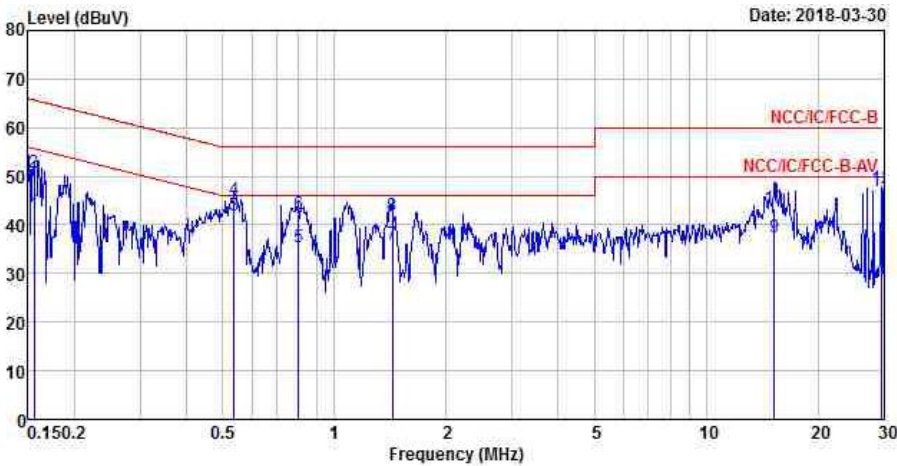
Instrument for Conducted Test

Instrument	Manufacturer	Model No.	Serial No.	Spec.	Calibration Date	Calibration Due Date
Spectrum Analyzer	R&S	FSV 40	101515	9kHz~40GHz	08/Dec/2017	07/Dec/2018
Temp. and Humidity Chamber	Giant Force	GTH-225-20-SP-SD	MAA1112-007	-20 ~ 100°C	10/May/2017	09/May/2018
Signal Generator	R&S	SMR40	100116	10MHz ~ 40GHz	27/Jul/2017	26/Jul/2018
RF Cable-1.5m	HUBER+SUHNER	SUCOFLEX_104	MY12582/4	30MHz ~ 26.5GHz	25/Aug/2017	24/Aug/2018
RF Cable-1.5m	HUBER+SUHNER	SUCOFLEX_104	MY12583/4	30MHz ~ 26.5GHz	25/Aug/2017	24/Aug/2018
RF Cable-1.5m	HUBER+SUHNER	SUCOFLEX_104	MY12581/4	30MHz ~ 26.5GHz	25/Aug/2017	24/Aug/2018
RF Cable-1.5m	HUBER+SUHNER	SUCOFLEX_104	MY12584/4	30MHz ~ 26.5GHz	25/Aug/2017	24/Aug/2018
RF Cable-0.2m	HUBER+SUHNER	SUCOFLEX_104	MY10710/4	30MHz ~ 26.5GHz	25/Aug/2017	24/Aug/2018
RF Cable-0.2m	HUBER+SUHNER	SUCOFLEX_104	MY10709/4	30MHz ~ 26.5GHz	25/Aug/2017	24/Aug/2018
RF Cable-0.2m	HUBER+SUHNER	SUCOFLEX_104	MY10712/4	30MHz ~ 26.5GHz	25/Aug/2017	24/Aug/2018
RF Cable-0.5m	HUBER+SUHNER	SUCOFLEX_104	MY10713/4	30MHz ~ 26.5GHz	25/Aug/2017	24/Aug/2018
Power Sensor	Anritsu	MA2411B	1339407	300MHz ~ 40GHz	10/May/2017	09/May/2018
Power Meter	Anritsu	ML2495A	1517010	300MHz ~ 40GHz	06/Nov/2017	05/Nov/2018



AC Power-line Conducted Emissions Result																																																																																																																																										
Operating Mode	1	Power Phase	Neutral																																																																																																																																							
Operating Function	PoE Mode																																																																																																																																									
<div style="text-align: right;">Date: 2018-03-30</div> <p>The graph displays the AC power-line conducted emissions. The y-axis represents the level in dBuV, ranging from 0 to 80. The x-axis represents the frequency in MHz, ranging from 0.1502 to 30. Two limit lines are shown: a red line for NCC/IC/FCC-B and a blue line for NCC/IC/FCC-B-AV. The measured emission is shown as a blue line with several peaks. Peaks are numbered 1 through 12. Peak 11 is the maximum value at 29.6093 MHz, with a level of 46.02 dBuV, which is 3.98 dB below the 50.00 dBuV limit.</p> <table border="1"> <thead> <tr> <th></th> <th>Freq</th> <th>Level</th> <th>Over</th> <th>Limit</th> <th>Read</th> <th>LISN</th> <th>Cable</th> <th>Remark</th> </tr> <tr> <th></th> <th>MHz</th> <th>dBuV</th> <th>Limit</th> <th>Line</th> <th>Level</th> <th>Factor</th> <th>Loss</th> <th>Remark</th> </tr> <tr> <th></th> <th></th> <th></th> <th>dB</th> <th>dBuV</th> <th>dBuV</th> <th>dB</th> <th>dB</th> <th></th> </tr> </thead> <tbody> <tr><td>1</td><td>0.1557</td><td>42.66</td><td>-13.03</td><td>55.69</td><td>32.99</td><td>9.63</td><td>0.04</td><td>Average</td></tr> <tr><td>2</td><td>0.1557</td><td>51.79</td><td>-13.90</td><td>65.69</td><td>42.12</td><td>9.63</td><td>0.04</td><td>QP</td></tr> <tr><td>3</td><td>0.1796</td><td>31.19</td><td>-23.31</td><td>54.50</td><td>21.55</td><td>9.62</td><td>0.02</td><td>Average</td></tr> <tr><td>4</td><td>0.1796</td><td>44.56</td><td>-19.94</td><td>64.50</td><td>34.92</td><td>9.62</td><td>0.02</td><td>QP</td></tr> <tr><td>5</td><td>0.5436</td><td>41.57</td><td>-4.43</td><td>46.00</td><td>31.89</td><td>9.61</td><td>0.07</td><td>Average</td></tr> <tr><td>6</td><td>0.5436</td><td>45.58</td><td>-10.42</td><td>56.00</td><td>35.90</td><td>9.61</td><td>0.07</td><td>QP</td></tr> <tr><td>7</td><td>0.8002</td><td>35.83</td><td>-10.17</td><td>46.00</td><td>26.19</td><td>9.62</td><td>0.02</td><td>Average</td></tr> <tr><td>8</td><td>0.8002</td><td>42.28</td><td>-13.72</td><td>56.00</td><td>32.64</td><td>9.62</td><td>0.02</td><td>QP</td></tr> <tr><td>9</td><td>22.3964</td><td>42.77</td><td>-7.23</td><td>50.00</td><td>32.97</td><td>9.70</td><td>0.10</td><td>Average</td></tr> <tr><td>10</td><td>22.3964</td><td>45.03</td><td>-14.97</td><td>60.00</td><td>35.23</td><td>9.70</td><td>0.10</td><td>QP</td></tr> <tr><td>11 MAX</td><td>29.6093</td><td>46.02</td><td>-3.98</td><td>50.00</td><td>36.05</td><td>9.69</td><td>0.28</td><td>Average</td></tr> <tr><td>12</td><td>29.6093</td><td>47.67</td><td>-12.33</td><td>60.00</td><td>37.70</td><td>9.69</td><td>0.28</td><td>QP</td></tr> </tbody> </table>					Freq	Level	Over	Limit	Read	LISN	Cable	Remark		MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark				dB	dBuV	dBuV	dB	dB		1	0.1557	42.66	-13.03	55.69	32.99	9.63	0.04	Average	2	0.1557	51.79	-13.90	65.69	42.12	9.63	0.04	QP	3	0.1796	31.19	-23.31	54.50	21.55	9.62	0.02	Average	4	0.1796	44.56	-19.94	64.50	34.92	9.62	0.02	QP	5	0.5436	41.57	-4.43	46.00	31.89	9.61	0.07	Average	6	0.5436	45.58	-10.42	56.00	35.90	9.61	0.07	QP	7	0.8002	35.83	-10.17	46.00	26.19	9.62	0.02	Average	8	0.8002	42.28	-13.72	56.00	32.64	9.62	0.02	QP	9	22.3964	42.77	-7.23	50.00	32.97	9.70	0.10	Average	10	22.3964	45.03	-14.97	60.00	35.23	9.70	0.10	QP	11 MAX	29.6093	46.02	-3.98	50.00	36.05	9.69	0.28	Average	12	29.6093	47.67	-12.33	60.00	37.70	9.69	0.28	QP
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<table border="1" style="width: 100%; border-collapse: collapse; font-size: x-small;"> <thead> <tr> <th></th> <th>Freq</th> <th>Level</th> <th>Over Limit</th> <th>Limit Line</th> <th>Read Level</th> <th>LISN Factor</th> <th>Cable Loss</th> <th>Remark</th> </tr> <tr> <th></th> <th>MHz</th> <th>dBuV</th> <th>dB</th> <th>dBuV</th> <th>dBuV</th> <th>dB</th> <th>dB</th> <th></th> </tr> </thead> <tbody> <tr><td>1</td><td>0.1557</td><td>42.14</td><td>-13.55</td><td>55.69</td><td>32.48</td><td>9.62</td><td>0.04</td><td>Average</td></tr> <tr><td>2</td><td>0.1557</td><td>50.92</td><td>-14.77</td><td>65.69</td><td>41.26</td><td>9.62</td><td>0.04</td><td>QP</td></tr> <tr><td>3</td><td>0.5378</td><td>41.90</td><td>-4.10</td><td>46.00</td><td>32.22</td><td>9.61</td><td>0.07</td><td>Average</td></tr> <tr><td>4</td><td>0.5378</td><td>45.21</td><td>-10.79</td><td>56.00</td><td>35.53</td><td>9.61</td><td>0.07</td><td>QP</td></tr> <tr><td>5</td><td>0.8002</td><td>35.36</td><td>-10.64</td><td>46.00</td><td>25.73</td><td>9.61</td><td>0.02</td><td>Average</td></tr> <tr><td>6</td><td>0.8002</td><td>42.21</td><td>-13.79</td><td>56.00</td><td>32.58</td><td>9.61</td><td>0.02</td><td>QP</td></tr> <tr><td>7</td><td>1.4333</td><td>35.96</td><td>-10.04</td><td>46.00</td><td>26.34</td><td>9.62</td><td>0.00</td><td>Average</td></tr> <tr><td>8</td><td>1.4333</td><td>41.88</td><td>-14.12</td><td>56.00</td><td>32.26</td><td>9.62</td><td>0.00</td><td>QP</td></tr> <tr><td>9</td><td>15.2261</td><td>37.53</td><td>-12.47</td><td>50.00</td><td>27.88</td><td>9.64</td><td>0.01</td><td>Average</td></tr> <tr><td>10</td><td>15.2261</td><td>43.37</td><td>-16.63</td><td>60.00</td><td>33.72</td><td>9.64</td><td>0.01</td><td>QP</td></tr> <tr style="border: 2px solid black;"><td>11 MAX</td><td>29.6125</td><td>46.90</td><td>-3.10</td><td>50.00</td><td>37.12</td><td>9.50</td><td>0.28</td><td>Average</td></tr> <tr><td>12</td><td>29.6125</td><td>47.51</td><td>-12.49</td><td>60.00</td><td>37.73</td><td>9.50</td><td>0.28</td><td>QP</td></tr> </tbody> </table>					Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark		MHz	dBuV	dB	dBuV	dBuV	dB	dB		1	0.1557	42.14	-13.55	55.69	32.48	9.62	0.04	Average	2	0.1557	50.92	-14.77	65.69	41.26	9.62	0.04	QP	3	0.5378	41.90	-4.10	46.00	32.22	9.61	0.07	Average	4	0.5378	45.21	-10.79	56.00	35.53	9.61	0.07	QP	5	0.8002	35.36	-10.64	46.00	25.73	9.61	0.02	Average	6	0.8002	42.21	-13.79	56.00	32.58	9.61	0.02	QP	7	1.4333	35.96	-10.04	46.00	26.34	9.62	0.00	Average	8	1.4333	41.88	-14.12	56.00	32.26	9.62	0.00	QP	9	15.2261	37.53	-12.47	50.00	27.88	9.64	0.01	Average	10	15.2261	43.37	-16.63	60.00	33.72	9.64	0.01	QP	11 MAX	29.6125	46.90	-3.10	50.00	37.12	9.50	0.28	Average	12	29.6125	47.51	-12.49	60.00	37.73	9.50	0.28	QP
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**Summary**

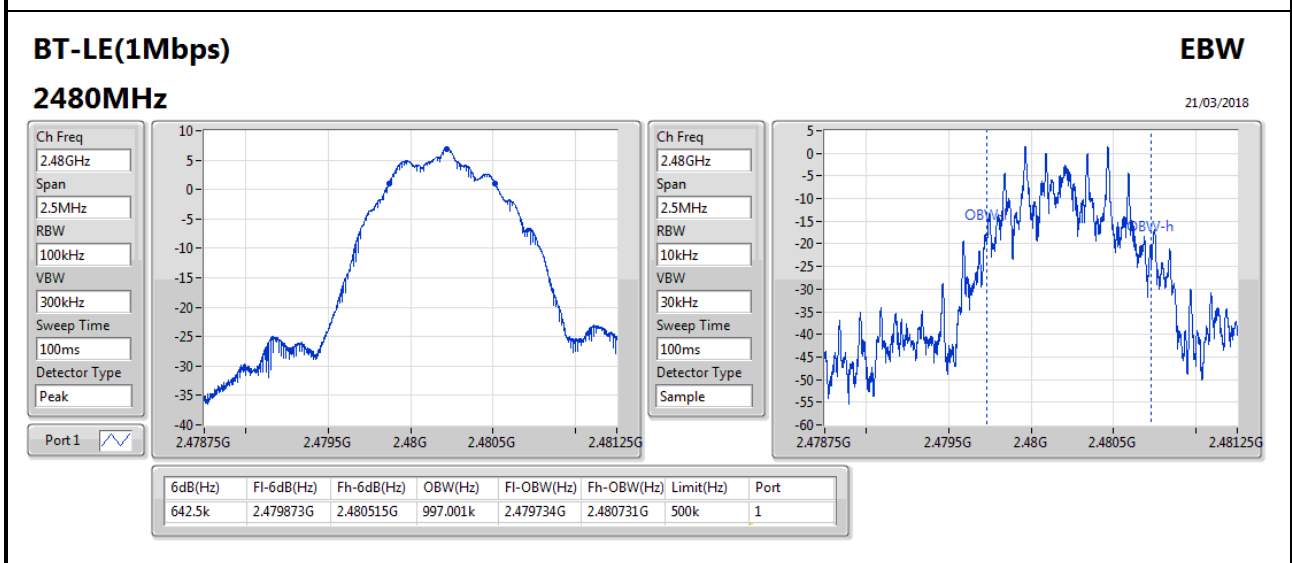
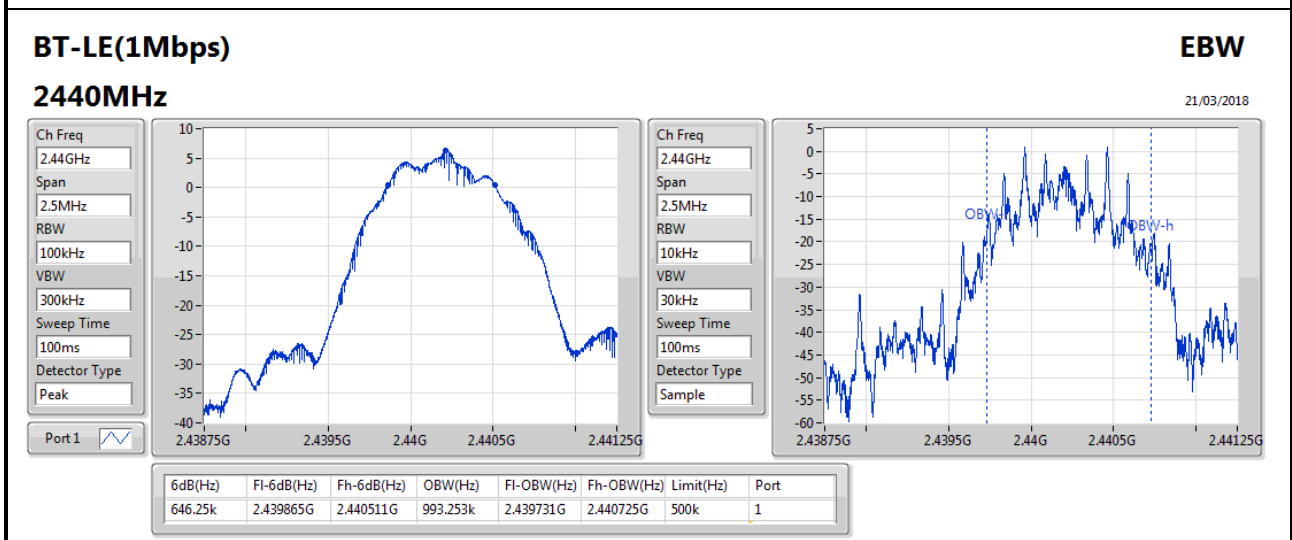
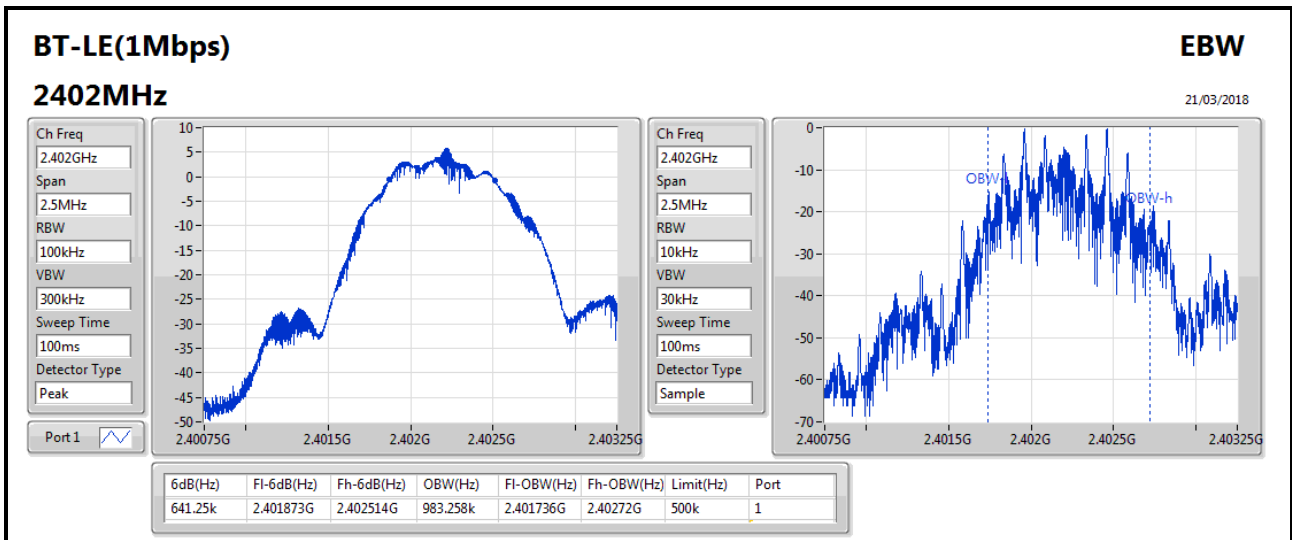
Mode	Max-N dB (Hz)	Max-OBW (Hz)	ITU-Code	Min-N dB (Hz)	Min-OBW (Hz)
2.4-2.4835GHz	-	-	-	-	-
BT-LE(1Mbps)	646.25k	997.001k	997KF1D	641.25k	983.258k

**Max-N dB** = Maximum 6dB down bandwidth; **Max-OBW** = Maximum 99% occupied bandwidth;  
**Min-N dB** = Minimum 6dB down bandwidth; **Min-OBW** = Minimum 99% occupied bandwidth;

**Result**

Mode	Result	Limit (Hz)	Port 1-N dB (Hz)	Port 1-OBW (Hz)
BT-LE(1Mbps)	-	-	-	-
2402MHz_TnomVnom	Pass	500k	641.25k	983.258k
2440MHz_TnomVnom	Pass	500k	646.25k	993.253k
2480MHz_TnomVnom	Pass	500k	642.5k	997.001k

**Port X-N dB** = Port X 6dB down bandwidth; **Port X-OBW** = Port X 99% occupied bandwidth;





Summary

Mode	Power (dBm)	Power (W)
2.4-2.4835GHz	-	-
BT-LE(1Mbps)	7.30	0.00537

Result

Mode	Result	Gain (dBi)	Power (dBm)	Power Limit (dBm)
BT-LE(1Mbps)	-	-	-	-
2402MHz_TnomVnom	Pass	1.80	5.31	30.00
2440MHz_TnomVnom	Pass	1.80	6.75	30.00
2480MHz_TnomVnom	Pass	1.80	7.30	30.00



Summary

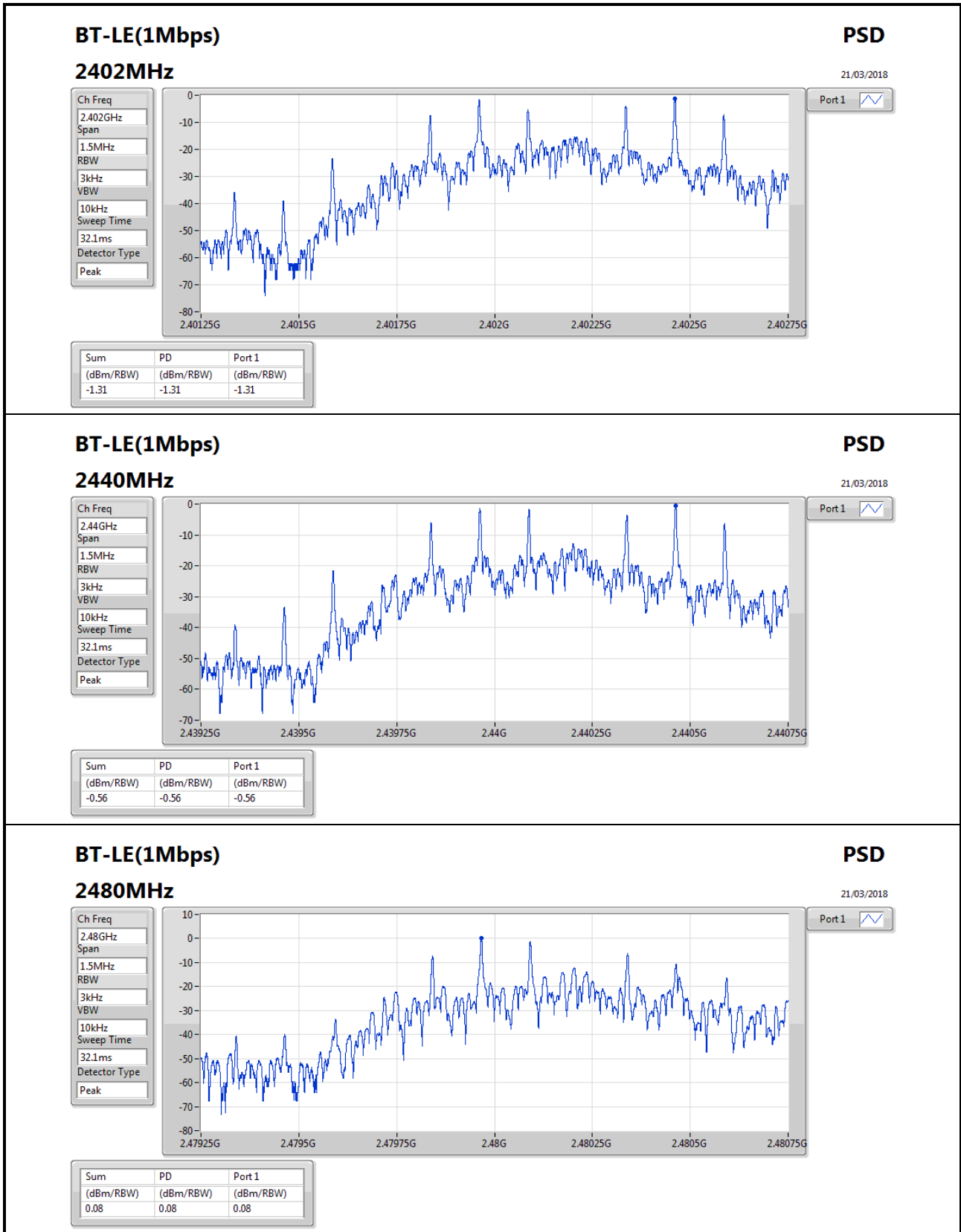
Mode	PD (dBm/RBW)
2.4-2.4835GHz	-
BT-LE(1Mbps)	0.08

RBW=3kHz.

Result

Mode	Result	Gain (dBi)	PD (dBm/RBW)	PD Limit (dBm/RBW)
BT-LE(1Mbps)	-	-	-	-
2402MHz_TnomVnom	Pass	1.80	-1.31	8.00
2440MHz_TnomVnom	Pass	1.80	-0.56	8.00
2480MHz_TnomVnom	Pass	1.80	0.08	8.00

RBW=3kHz.



### BT-LE(1Mbps)

#### 2480MHz

### PSD

21/03/2018

Ch Freq  
2.48GHz

Span  
1.5MHz

RBW  
3kHz

VBW  
10kHz

Sweep Time  
32.1ms

Detector Type  
Peak

Port 1

Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
0.08	0.08	0.08



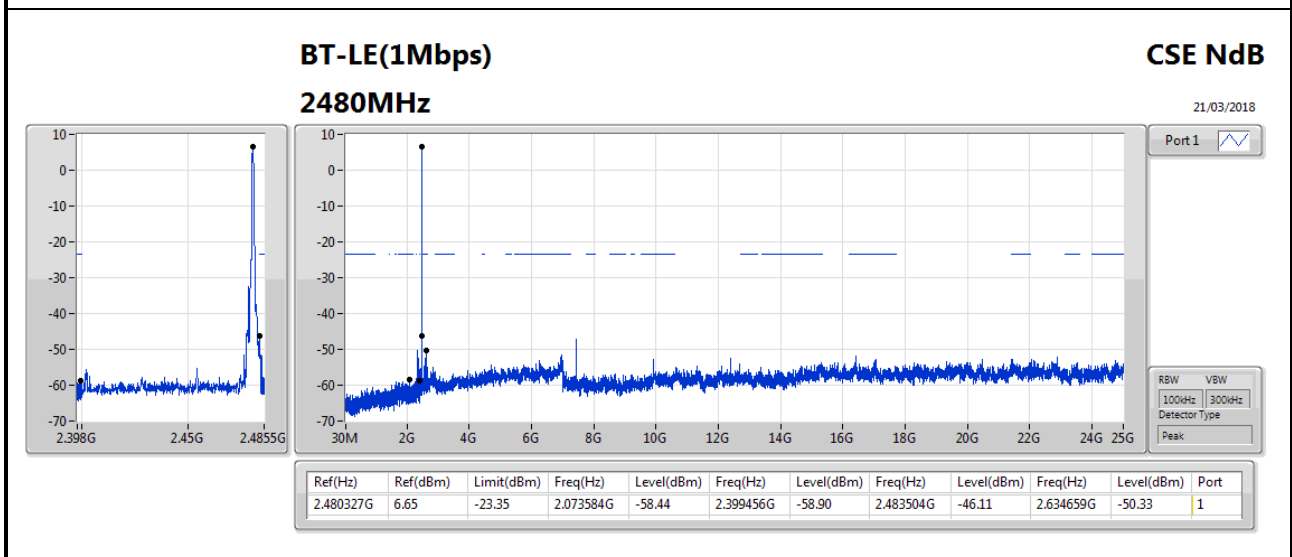
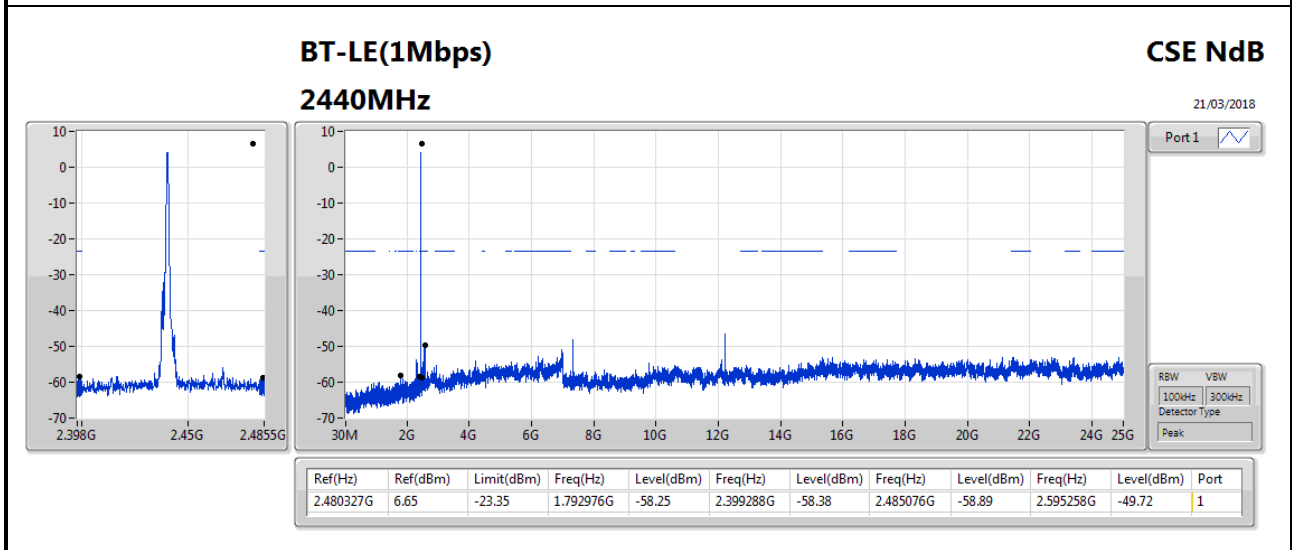
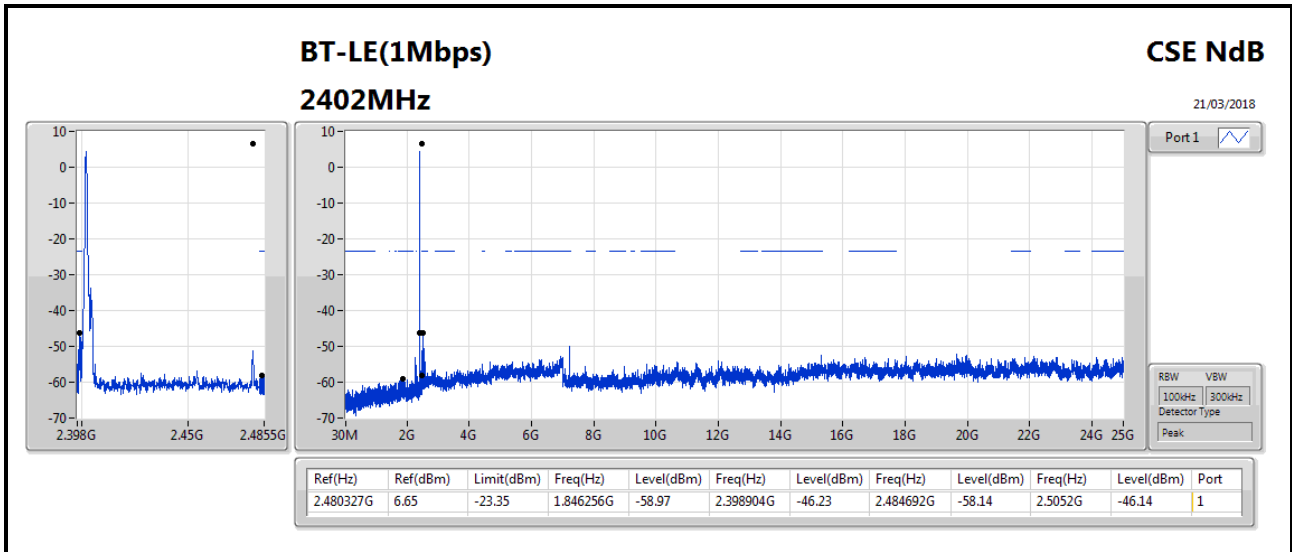


**Summary**

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-LE(1Mbps)	Pass	2.480327G	6.65	-23.35	2.073584G	-58.44	2.399456G	-58.90	2.483504G	-46.11	2.634659G	-50.33	1

**Result**

Mode	Result	Ref (Hz)	Ref (dBm)	Limit (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Port
BT-LE(1Mbps)	-	-	-	-	-	-	-	-	-	-	-	-	-
2402MHz_TnomVnom	Pass	2.480327G	6.65	-23.35	1.846256G	-58.97	2.398904G	-46.23	2.484692G	-58.14	2.5052G	-46.14	1
2440MHz_TnomVnom	Pass	2.480327G	6.65	-23.35	1.792976G	-58.25	2.399288G	-58.38	2.485076G	-58.89	2.595258G	-49.72	1
2480MHz_TnomVnom	Pass	2.480327G	6.65	-23.35	2.073584G	-58.44	2.399456G	-58.90	2.483504G	-46.11	2.634659G	-50.33	1





Summary

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-	-
BT-LE(1Mbps)	Pass	QP	30M	35.73	40.00	-4.27	-4.45	3	Vertical	227	1.00	-



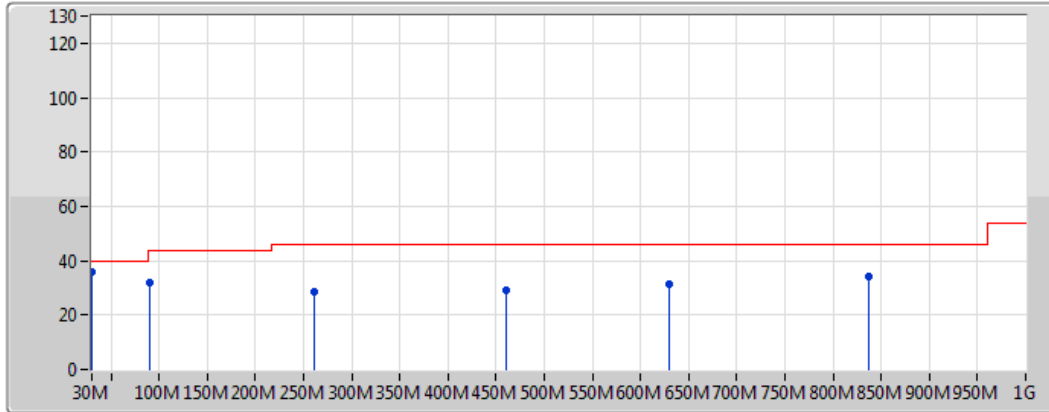
Result

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
BT-LE(1Mbps)	-	-	-	-	-	-	-	-	-	-	-	-
2440MHz	Pass	PK	37.76M	33.37	40.00	-6.63	-8.30	3	Horizontal	360	1.00	-
2440MHz	Pass	PK	90.14M	27.13	43.50	-16.37	-12.35	3	Horizontal	360	1.00	-
2440MHz	Pass	PK	258.92M	33.07	46.00	-12.93	-5.77	3	Horizontal	360	1.00	-
2440MHz	Pass	PK	437.4M	28.42	46.00	-17.58	-3.07	3	Horizontal	360	1.00	-
2440MHz	Pass	PK	613.94M	31.38	46.00	-14.62	-0.66	3	Horizontal	360	1.00	-
2440MHz	Pass	PK	844.8M	34.42	46.00	-11.58	1.97	3	Horizontal	360	1.00	-
2440MHz	Pass	PK	90.14M	31.69	43.50	-11.81	-12.35	3	Vertical	0	1.00	-
2440MHz	Pass	PK	260.86M	28.57	46.00	-17.43	-5.68	3	Vertical	0	1.00	-
2440MHz	Pass	PK	460.68M	29.20	46.00	-16.80	-2.74	3	Vertical	0	1.00	-
2440MHz	Pass	PK	629.46M	31.29	46.00	-14.71	-0.35	3	Vertical	0	1.00	-
2440MHz	Pass	PK	837.04M	34.30	46.00	-11.70	1.89	3	Vertical	0	1.00	-
2440MHz	Pass	QP	30M	35.73	40.00	-4.27	-4.45	3	Vertical	227	1.00	-

### BT-LE(1Mbps)

### 2440MHz\_PoE

24/03/2018



Legend:

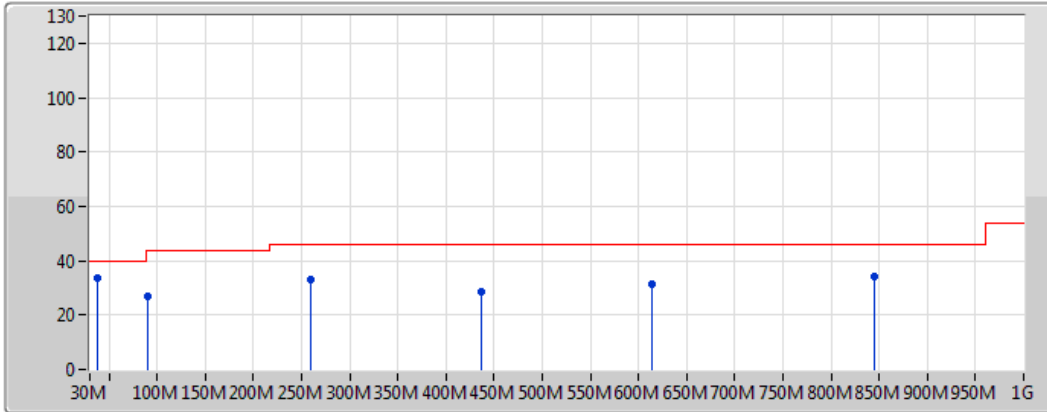
- Lim.PK (Red line)
- PK (Blue line)

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
PK	90.14M	31.69	43.50	-11.81	-12.35	3	Vertical	0	1.00	-	44.04	14.02	1.39	27.76
PK	260.86M	28.57	46.00	-17.43	-5.68	3	Vertical	0	1.00	-	34.25	18.86	2.76	27.30
PK	460.68M	29.20	46.00	-16.80	-2.74	3	Vertical	0	1.00	-	31.94	22.29	3.25	28.28
PK	629.46M	31.29	46.00	-14.71	-0.35	3	Vertical	0	1.00	-	31.64	24.41	3.75	28.51
PK	837.04M	34.30	46.00	-11.70	1.89	3	Vertical	0	1.00	-	32.41	25.58	4.23	27.92
QP	30M	35.73	40.00	-4.27	-4.45	3	Vertical	227	1.00	-	40.18	23.11	0.29	27.85

### BT-LE(1Mbps)

### 2440MHz\_PoE

24/03/2018



Legend:

- Lim.PK (Red line)
- PK (Blue line)

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
PK	37.76M	33.37	40.00	-6.63	-8.30	3	Horizontal	360	1.00	-	41.67	18.87	0.57	27.74
PK	90.14M	27.13	43.50	-16.37	-12.35	3	Horizontal	360	1.00	-	39.48	14.02	1.39	27.76
PK	258.92M	33.07	46.00	-12.93	-5.77	3	Horizontal	360	1.00	-	38.84	18.78	2.76	27.30
PK	437.4M	28.42	46.00	-17.58	-3.07	3	Horizontal	360	1.00	-	31.49	21.87	3.22	28.16
PK	613.94M	31.38	46.00	-14.62	-0.66	3	Horizontal	360	1.00	-	32.04	24.16	3.71	28.53
PK	844.8M	34.42	46.00	-11.58	1.97	3	Horizontal	360	1.00	-	32.45	25.62	4.24	27.89



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-LE(1Mbps)	Pass	AV	2.483502G	49.55	54.00	-4.45	30.79	3	Horizontal	149	1.40	-



Result

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
BT-LE(1Mbps)	-	-	-	-	-	-	-	-	-	-	-	-
2402MHz	Pass	AV	2.3648G	45.50	54.00	-8.50	30.37	3	Horizontal	137	1.24	-
2402MHz	Pass	AV	2.4022G	102.15	Inf	-Inf	30.50	3	Horizontal	137	1.24	-
2402MHz	Pass	PK	2.357G	57.15	74.00	-16.85	30.34	3	Horizontal	137	1.24	-
2402MHz	Pass	PK	2.4026G	103.50	Inf	-Inf	30.50	3	Horizontal	137	1.24	-
2402MHz	Pass	AV	2.3632G	45.78	54.00	-8.22	30.36	3	Vertical	356	1.01	-
2402MHz	Pass	AV	2.4022G	93.25	Inf	-Inf	30.50	3	Vertical	356	1.01	-
2402MHz	Pass	PK	2.362G	57.94	74.00	-16.06	30.36	3	Vertical	356	1.01	-
2402MHz	Pass	PK	2.4026G	94.57	Inf	-Inf	30.50	3	Vertical	356	1.01	-
2402MHz	Pass	AV	4.80404G	33.96	54.00	-20.04	5.85	3	Horizontal	219	2.12	-
2402MHz	Pass	PK	4.804998G	47.25	74.00	-26.75	5.85	3	Horizontal	219	2.12	-
2402MHz	Pass	AV	4.804359G	36.53	54.00	-17.47	5.85	3	Vertical	76	1.02	-
2402MHz	Pass	PK	4.80392G	49.43	74.00	-24.57	5.85	3	Vertical	76	1.02	-
2440MHz	Pass	AV	2.362G	45.93	54.00	-8.07	30.36	3	Horizontal	149	1.63	-
2440MHz	Pass	AV	2.44G	101.66	Inf	-Inf	30.63	3	Horizontal	149	1.63	-
2440MHz	Pass	AV	2.4992G	46.53	54.00	-7.47	30.85	3	Horizontal	149	1.63	-
2440MHz	Pass	PK	2.3868G	57.56	74.00	-16.44	30.45	3	Horizontal	149	1.63	-
2440MHz	Pass	PK	2.44G	102.86	Inf	-Inf	30.63	3	Horizontal	149	1.63	-
2440MHz	Pass	PK	2.4968G	58.20	74.00	-15.80	30.84	3	Horizontal	149	1.63	-
2440MHz	Pass	AV	2.3484G	45.83	54.00	-8.17	30.31	3	Vertical	352	1.01	-
2440MHz	Pass	AV	2.44G	92.89	Inf	-Inf	30.63	3	Vertical	352	1.01	-
2440MHz	Pass	AV	2.4848G	46.84	54.00	-7.16	30.79	3	Vertical	352	1.01	-
2440MHz	Pass	PK	2.3652G	57.96	74.00	-16.04	30.37	3	Vertical	352	1.01	-
2440MHz	Pass	PK	2.44G	94.10	Inf	-Inf	30.63	3	Vertical	352	1.01	-
2440MHz	Pass	PK	2.496G	59.38	74.00	-14.62	30.84	3	Vertical	352	1.01	-
2440MHz	Pass	AV	4.88024G	33.82	54.00	-20.18	6.02	3	Horizontal	219	2.18	-
2440MHz	Pass	AV	7.31982G	40.54	54.00	-13.46	11.35	3	Horizontal	201	2.20	-
2440MHz	Pass	PK	4.87984G	47.38	74.00	-26.62	6.02	3	Horizontal	219	2.18	-
2440MHz	Pass	PK	7.31978G	54.21	74.00	-19.79	11.35	3	Horizontal	201	2.20	-
2440MHz	Pass	AV	4.880399G	36.25	54.00	-17.75	6.02	3	Vertical	78	1.04	-
2440MHz	Pass	AV	7.31998G	41.93	54.00	-12.07	11.35	3	Vertical	247	1.02	-
2440MHz	Pass	PK	4.88004G	48.24	74.00	-25.76	6.02	3	Vertical	78	1.04	-
2440MHz	Pass	PK	7.31986G	55.37	74.00	-18.63	11.35	3	Vertical	247	1.02	-
2480MHz	Pass	AV	2.4802G	102.35	Inf	-Inf	30.78	3	Horizontal	149	1.40	-
2480MHz	Pass	AV	2.483502G	49.55	54.00	-4.45	30.79	3	Horizontal	149	1.40	-
2480MHz	Pass	PK	2.4802G	103.54	Inf	-Inf	30.78	3	Horizontal	149	1.40	-
2480MHz	Pass	PK	2.4836G	60.00	74.00	-14.00	30.79	3	Horizontal	149	1.40	-
2480MHz	Pass	AV	2.4802G	92.35	Inf	-Inf	30.78	3	Vertical	190	2.40	-
2480MHz	Pass	AV	2.4836G	46.77	54.00	-7.23	30.79	3	Vertical	190	2.40	-
2480MHz	Pass	PK	2.48G	93.62	Inf	-Inf	30.78	3	Vertical	190	2.40	-
2480MHz	Pass	PK	2.4842G	58.19	74.00	-15.81	30.79	3	Vertical	190	2.40	-
2480MHz	Pass	AV	4.960359G	35.75	54.00	-18.25	6.21	3	Horizontal	217	2.10	-
2480MHz	Pass	AV	7.43988G	40.70	54.00	-13.30	11.62	3	Horizontal	0	1.04	-
2480MHz	Pass	PK	4.96008G	48.28	74.00	-25.72	6.21	3	Horizontal	217	2.10	-
2480MHz	Pass	PK	7.4398G	53.80	74.00	-20.20	11.62	3	Horizontal	0	1.04	-
2480MHz	Pass	AV	4.960359G	36.89	54.00	-17.11	6.21	3	Vertical	77	1.01	-
2480MHz	Pass	AV	7.43992G	41.96	54.00	-12.04	11.62	3	Vertical	262	1.77	-
2480MHz	Pass	PK	4.95992G	49.13	74.00	-24.87	6.21	3	Vertical	77	1.01	-





## RSE TX above 1GHz Result

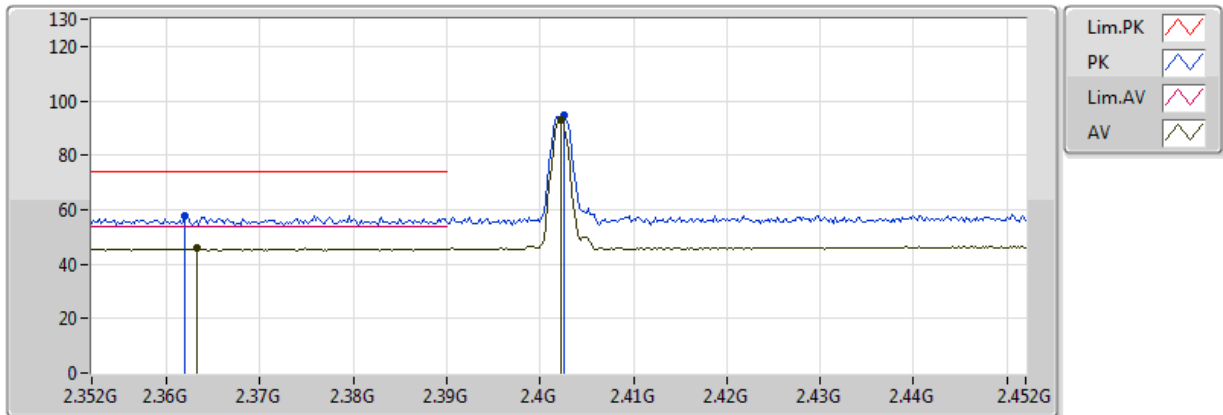
## Appendix F.2

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
2480MHz	Pass	PK	7.441357G	55.12	74.00	-18.88	11.62	3	Vertical	262	1.77	-

### BT-LE(1Mbps)

### 2402MHz\_TX

20/03/2018

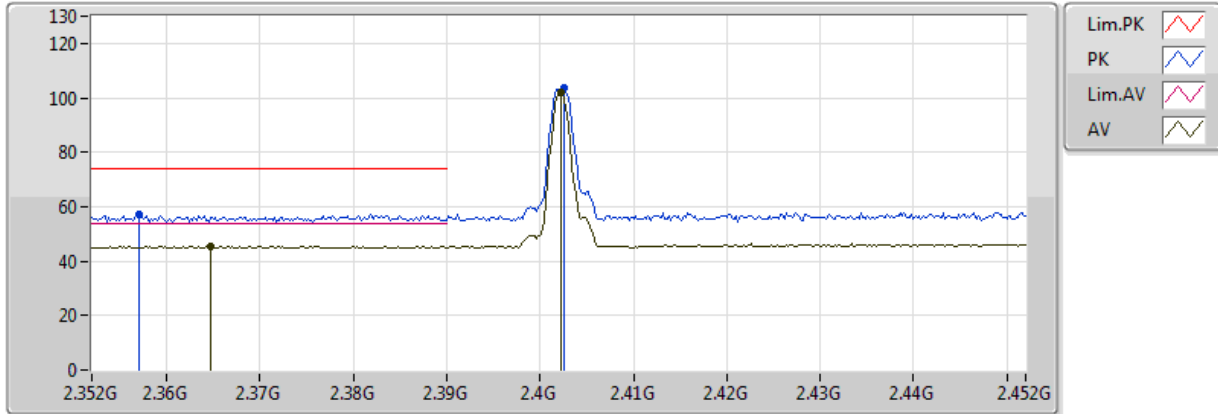


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	2.3632G	45.78	54.00	-8.22	30.36	3	Vertical	356	1.01	-	15.42	27.14	3.22	-
AV	2.4022G	93.25	Inf	-Inf	30.50	3	Vertical	356	1.01	-	62.75	27.25	3.25	-
PK	2.362G	57.94	74.00	-16.06	30.36	3	Vertical	356	1.01	-	27.58	27.14	3.22	-
PK	2.4026G	94.57	Inf	-Inf	30.50	3	Vertical	356	1.01	-	64.07	27.25	3.25	-

### BT-LE(1Mbps)

### 2402MHz\_TX

20/03/2018

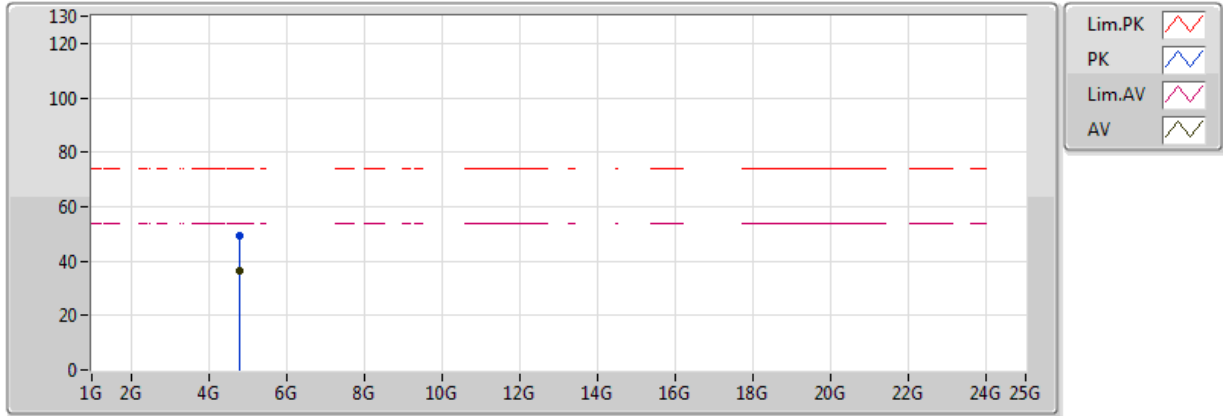


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	2.3648G	45.50	54.00	-8.50	30.37	3	Horizontal	137	1.24	-	15.13	27.15	3.22	-
AV	2.4022G	102.15	Inf	-Inf	30.50	3	Horizontal	137	1.24	-	71.65	27.25	3.25	-
PK	2.357G	57.15	74.00	-16.85	30.34	3	Horizontal	137	1.24	-	26.81	27.13	3.21	-
PK	2.4026G	103.50	Inf	-Inf	30.50	3	Horizontal	137	1.24	-	73.00	27.25	3.25	-

### BT-LE(1Mbps)

### 2402MHz\_TX

20/03/2018

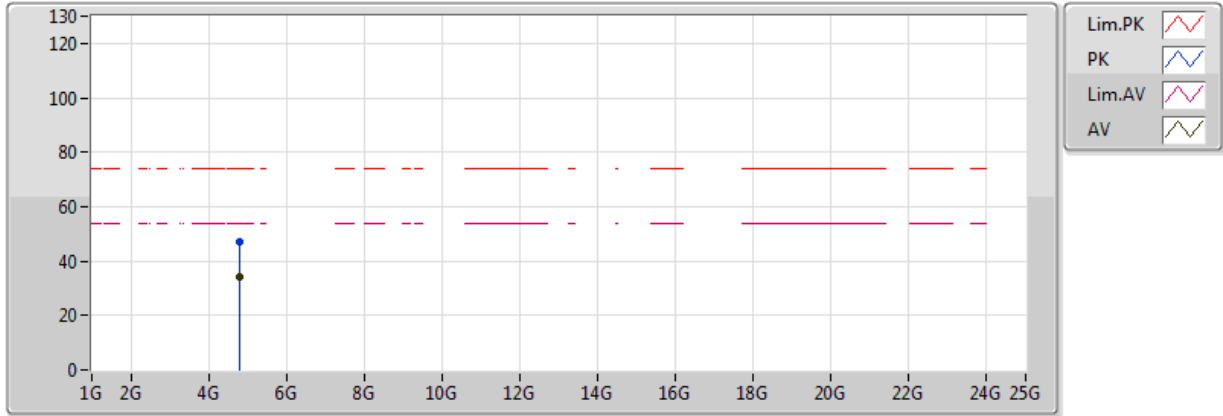


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	4.804359G	36.53	54.00	-17.47	5.85	3	Vertical	76	1.02	-	30.68	31.19	4.51	29.85
PK	4.80392G	49.43	74.00	-24.57	5.85	3	Vertical	76	1.02	-	43.58	31.19	4.51	29.85

### BT-LE(1Mbps)

### 2402MHz\_TX

20/03/2018

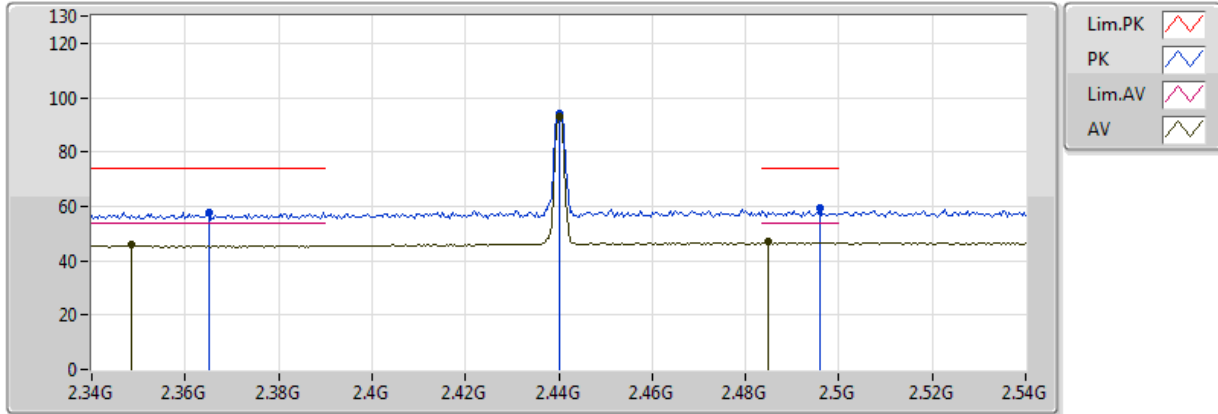


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	4.80404G	33.96	54.00	-20.04	5.85	3	Horizontal	219	2.12	-	28.11	31.19	4.51	29.85
PK	4.804998G	47.25	74.00	-26.75	5.85	3	Horizontal	219	2.12	-	41.40	31.19	4.51	29.85

### BT-LE(1Mbps)

### 2440MHz\_TX

20/03/2018

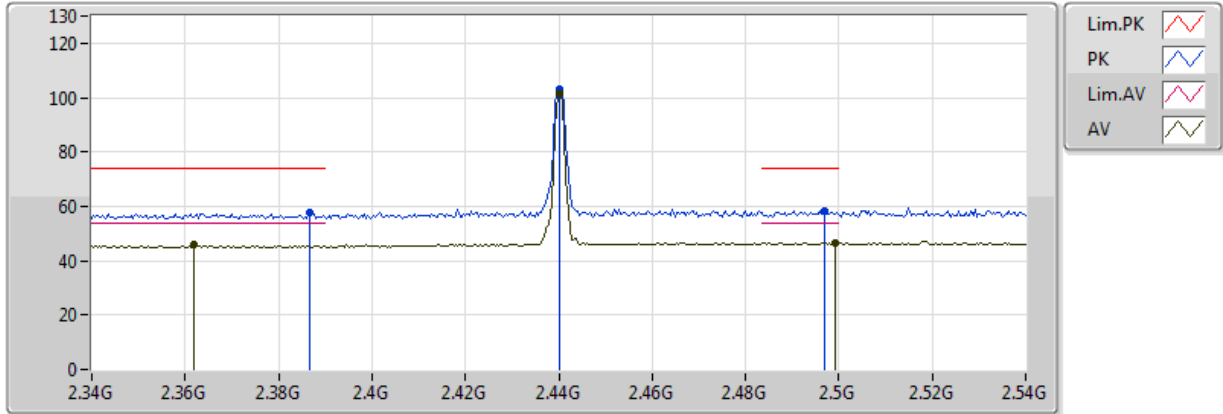


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	2.3484G	45.83	54.00	-8.17	30.31	3	Vertical	352	1.01	-	15.52	27.11	3.20	-
AV	2.44G	92.89	Inf	-Inf	30.63	3	Vertical	352	1.01	-	62.26	27.34	3.29	-
AV	2.4848G	46.84	54.00	-7.16	30.79	3	Vertical	352	1.01	-	16.05	27.46	3.33	-
PK	2.3652G	57.96	74.00	-16.04	30.37	3	Vertical	352	1.01	-	27.59	27.15	3.22	-
PK	2.44G	94.10	Inf	-Inf	30.63	3	Vertical	352	1.01	-	63.47	27.34	3.29	-
PK	2.496G	59.38	74.00	-14.62	30.84	3	Vertical	352	1.01	-	28.54	27.49	3.35	-

### BT-LE(1Mbps)

### 2440MHz\_TX

20/03/2018

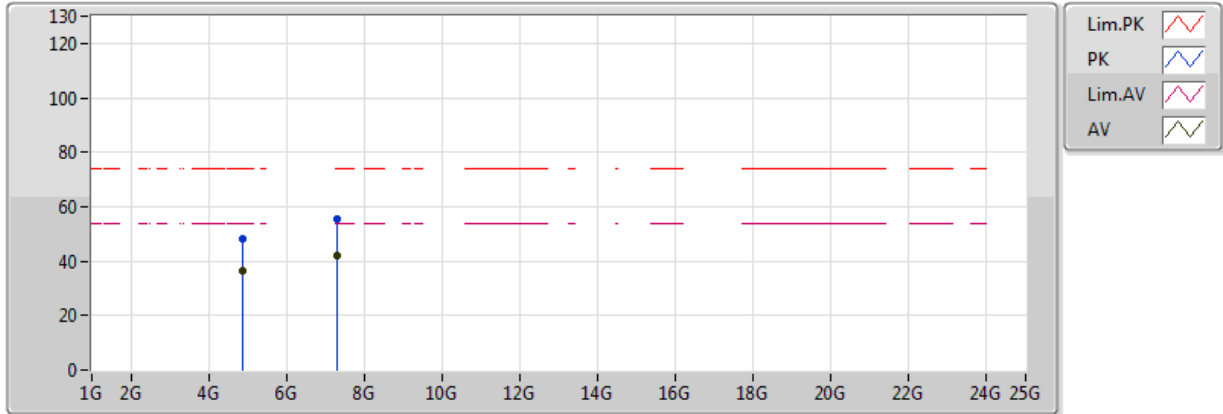


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	2.362G	45.93	54.00	-8.07	30.36	3	Horizontal	149	1.63	-	15.57	27.14	3.22	-
AV	2.44G	101.66	Inf	-Inf	30.63	3	Horizontal	149	1.63	-	71.03	27.34	3.29	-
AV	2.4992G	46.53	54.00	-7.47	30.85	3	Horizontal	149	1.63	-	15.68	27.50	3.35	-
PK	2.3868G	57.56	74.00	-16.44	30.45	3	Horizontal	149	1.63	-	27.11	27.21	3.24	-
PK	2.44G	102.86	Inf	-Inf	30.63	3	Horizontal	149	1.63	-	72.23	27.34	3.29	-
PK	2.4968G	58.20	74.00	-15.80	30.84	3	Horizontal	149	1.63	-	27.36	27.49	3.35	-

### BT-LE(1Mbps)

### 2440MHz\_TX

20/03/2018



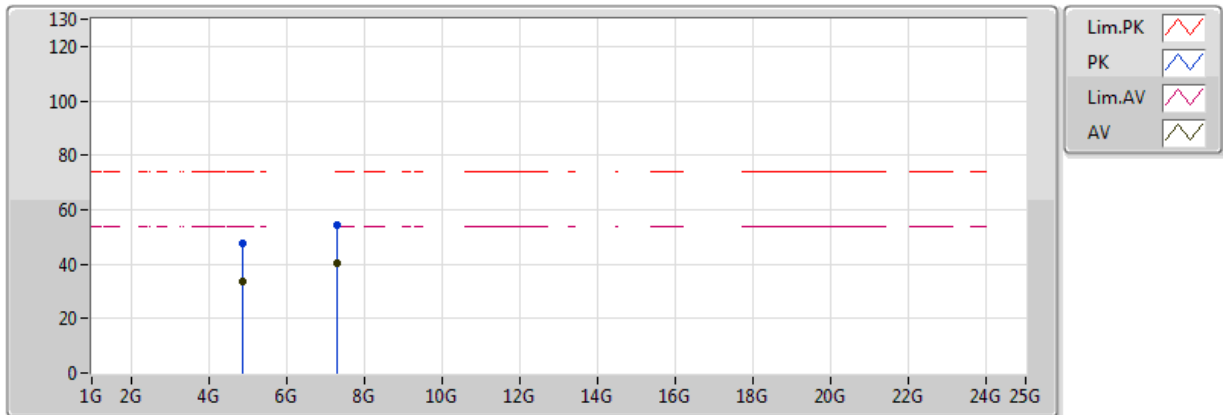
Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	4.880399G	36.25	54.00	-17.75	6.02	3	Vertical	78	1.04	-	30.23	31.31	4.55	29.83
AV	7.31998G	41.93	54.00	-12.07	11.35	3	Vertical	247	1.02	-	30.58	36.04	6.12	30.80
PK	4.88004G	48.24	74.00	-25.76	6.02	3	Vertical	78	1.04	-	42.22	31.31	4.55	29.83
PK	7.31986G	55.37	74.00	-18.63	11.35	3	Vertical	247	1.02	-	44.02	36.04	6.12	30.80



### BT-LE(1Mbps)

### 2440MHz\_TX

20/03/2018

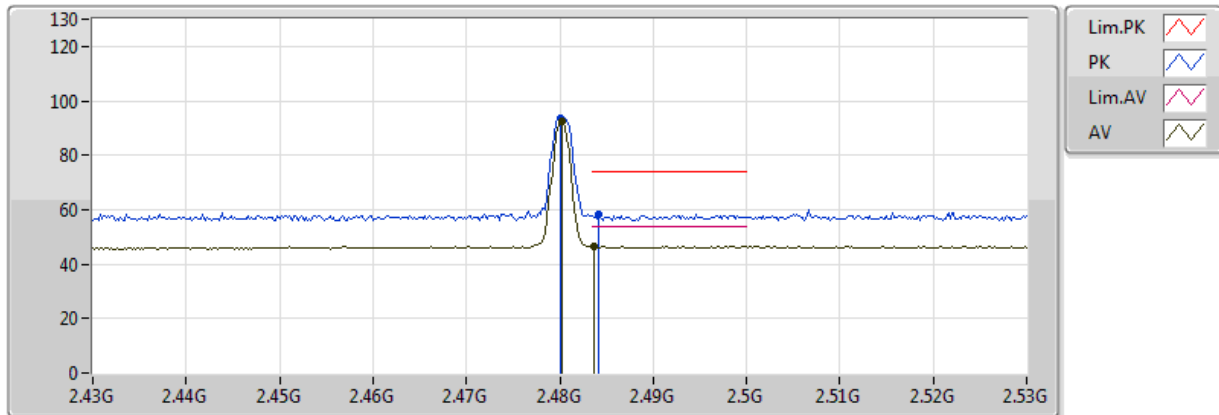


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	4.88024G	33.82	54.00	-20.18	6.02	3	Horizontal	219	2.18	-	27.80	31.31	4.55	29.83
AV	7.31982G	40.54	54.00	-13.46	11.35	3	Horizontal	201	2.20	-	29.19	36.04	6.12	30.80
PK	4.87984G	47.38	74.00	-26.62	6.02	3	Horizontal	219	2.18	-	41.36	31.31	4.55	29.83
PK	7.31978G	54.21	74.00	-19.79	11.35	3	Horizontal	201	2.20	-	42.86	36.04	6.12	30.80

### BT-LE(1Mbps)

### 2480MHz\_TX

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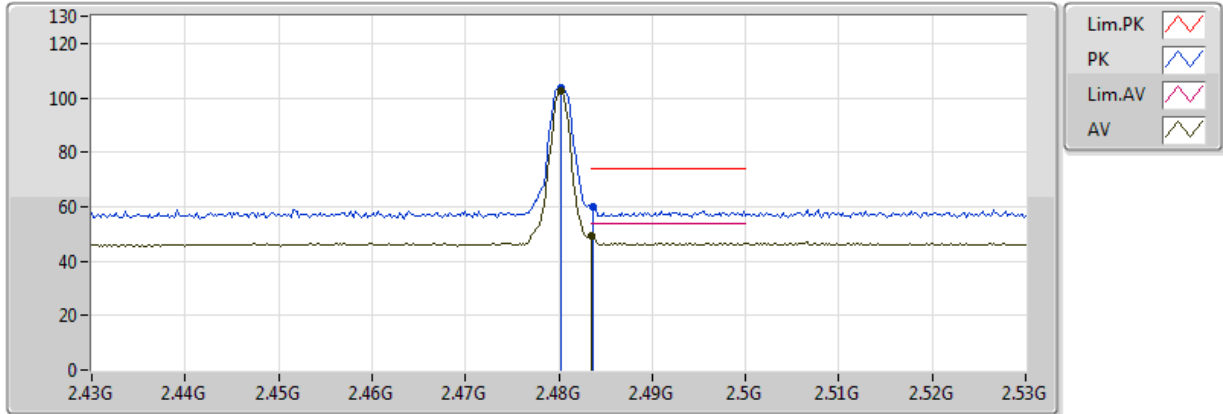


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	2.4802G	92.35	Inf	-Inf	30.78	3	Vertical	190	2.40	-	61.57	27.45	3.33	-
AV	2.4836G	46.77	54.00	-7.23	30.79	3	Vertical	190	2.40	-	15.98	27.46	3.33	-
PK	2.48G	93.62	Inf	-Inf	30.78	3	Vertical	190	2.40	-	62.84	27.45	3.33	-
PK	2.4842G	58.19	74.00	-15.81	30.79	3	Vertical	190	2.40	-	27.40	27.46	3.33	-

### BT-LE(1Mbps)

### 2480MHz\_TX

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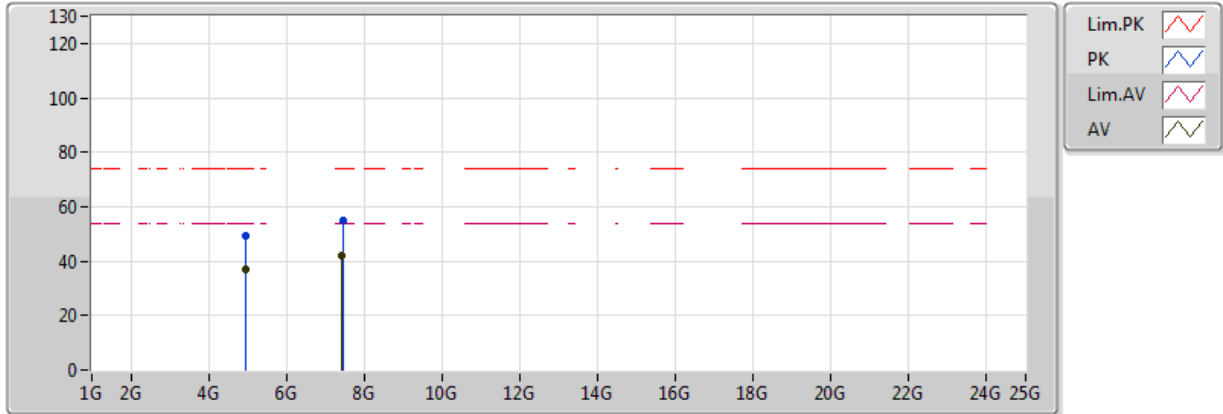


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	2.4802G	102.35	Inf	-Inf	30.78	3	Horizontal	149	1.40	-	71.57	27.45	3.33	-
AV	2.483502G	49.55	54.00	-4.45	30.79	3	Horizontal	149	1.40	-	18.76	27.46	3.33	-
PK	2.4802G	103.54	Inf	-Inf	30.78	3	Horizontal	149	1.40	-	72.76	27.45	3.33	-
PK	2.4836G	60.00	74.00	-14.00	30.79	3	Horizontal	149	1.40	-	29.21	27.46	3.33	-

### BT-LE(1Mbps)

### 2480MHz\_TX

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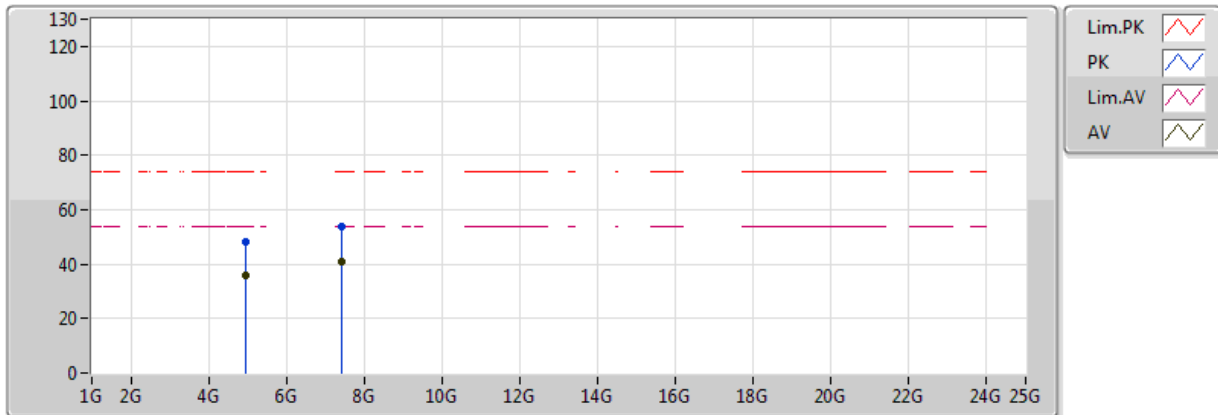
Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	4.960359G	36.89	54.00	-17.11	6.21	3	Vertical	77	1.01	-	30.68	31.44	4.59	29.82
AV	7.43992G	41.96	54.00	-12.04	11.62	3	Vertical	262	1.77	-	30.34	36.28	6.23	30.89
PK	4.95992G	49.13	74.00	-24.87	6.21	3	Vertical	77	1.01	-	42.92	31.44	4.59	29.82
PK	7.441357G	55.12	74.00	-18.88	11.62	3	Vertical	262	1.77	-	43.50	36.28	6.23	30.89



### BT-LE(1Mbps)

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Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	4.960359G	35.75	54.00	-18.25	6.21	3	Horizontal	217	2.10	-	29.54	31.44	4.59	29.82
AV	7.43988G	40.70	54.00	-13.30	11.62	3	Horizontal	0	1.04	-	29.08	36.28	6.23	30.89
PK	4.96008G	48.28	74.00	-25.72	6.21	3	Horizontal	217	2.10	-	42.07	31.44	4.59	29.82
PK	7.4398G	53.80	74.00	-20.20	11.62	3	Horizontal	0	1.04	-	42.18	36.28	6.23	30.89