

FCC Test Report

Equipment : Secured Wireless Access Point
Brand Name : Fortinet, Inc.
Model No. : FORTIAP-U321EVxxxxxx, FAP-U321EVxxxxxx;
FORTIAP-U323EVxxxxxx, FAP-U323EVxxxxxx.
(Refer to Section 1.1.5 for more details)
FCC ID : TVE-261DD011
Standard : 47 CFR FCC Part 15.247
Frequency : 2400 MHz – 2483.5 MHz
Function : ☒ Point-to-multipoint; ☐ Point-to-point
Applicant : Fortinet, Inc.
899 Kifer Road, Sunnyvale, CA 94086, USA
Manufacturer : Universal Global Scientific Industrial Co., Ltd
141, Lane 351, Sec. 1, Taiping Road., Tsaotuen,
Nantou 54261, Taiwan

The product sample received on May 15, 2017 and completely tested on Sep. 08, 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.


Phoenix Chen
SPORTON INTERNATIONAL INC.

Table of Contents

1	GENERAL DESCRIPTION	5
1.1	Information.....	5
1.2	Testing Applied Standards	6
1.3	Testing Location Information	6
1.4	Measurement Uncertainty	7
2	TEST CONFIGURATION OF EUT.....	8
2.1	Test Condition	8
2.2	Test Channel Mode	8
2.3	The Worst Case Measurement Configuration.....	9
2.4	Support Equipment.....	11
2.5	Test Setup Diagram	12
3	TRANSMITTER TEST RESULT	14
3.1	AC Power-line Conducted Emissions	14
3.2	DTS Bandwidth.....	15
3.3	Maximum Conducted Output Power	16
3.4	Power Spectral Density	18
3.5	Emissions in Non-restricted Frequency Bands	19
3.6	Emissions in Restricted Frequency Bands.....	20
4	TEST EQUIPMENT AND CALIBRATION DATA	24
APPENDIX A. TEST RESULTS OF AC POWER-LINE CONDUCTED EMISSIONS		
APPENDIX B. TEST RESULTS OF DTS BANDWIDTH		
APPENDIX C. TEST RESULTS OF MAXIMUM CONDUCTED OUTPUT POWER		
APPENDIX D. TEST RESULTS OF POWER SPECTRAL DENSITY		
APPENDIX E. TEST RESULTS OF EMISSIONS IN NON-RESTRICTED FREQUENCY BANDS		
APPENDIX F. TEST RESULTS OF EMISSIONS IN RESTRICTED FREQUENCY BANDS		
APPENDIX G. TEST RESULTS OF RADIATED EMISSION CO-LOCATION		
APPENDIX H. TEST PHOTOS		
PHOTOGRAPHS OF EUT v01		

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(a)	DTS Bandwidth	≥500kHz	Complied
3.3	15.247(b)	Maximum Conducted Output Power	Power [dBm]:30	Complied
3.4	15.247(e)	Power Spectral Density	PSD [dBm/3kHz]:8	Complied
3.5	15.247(d)	Emissions in Non-restricted Frequency Bands	Non-Restricted Bands: >30 dBc	Complied
3.6	15.247(d)	Emissions in Restricted Frequency Bands	Restricted Bands: FCC 15.209	Complied



SPORTON INTERNATIONAL INC.
TEL : 886-3-3273456
FAX : 886-3-3270973
FCC ID: TVE-261DD011

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.

1.1.2 Antenna Information

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	-	-	PIFA Antenna	I-PEX	4.5

1.1.3 EUT Information

Operational Condition	
EUT Power Type	From AC Adapter / 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) $\geq 1/T$
BT-LE(1Mbps)	0.625	2.041	391.25u	3k

1.1.5 Table for Multiple Listing

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

Model	Difference	Description
FORTIAP-U321EVxxxxxx	Internal antenna	where"x" can be used as "A-Z", or "-0-9, or"-",or blank for software changes or marketing purposes only
FAP-U321EVxxxxxx		
FORTIAP-U323EVxxxxxx	External antenna	where"x" can be used as "A-Z", or "-0-9, or"-",or blank for software changes or marketing purposes only
FAP-U323EVxxxxxx		
Note 1: The sample is the same one, only the antenna configuration is different.		
Note 2: For more detailed features description, please refer to the specifications or user's manual.		

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
- ♦ ANSI C63.4-2014
- ♦ 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
AC Conduction	CO04-HY	Teddy	22°C / 58%	23/Jun/2017
RF Conducted	TH01-HY	Gary	22.5°C / 64%	09/Jun/2017
Radiated < 1GHz	03CH09-HY	Eric	23.5°C / 55%	08/Sep/2017
Radiated > 1GHz	03CH09-HY	Jeff	23.2°C / 59%	16/Jun/2017

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 (30MHz ~ 1,000MHz)	2.1 dB	Confidence levels of 95%
Radiated Emission (1GHz ~ 18GHz)	2.6 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	2.9 dB	Confidence levels of 95%
Conducted Emission	1.3 dB	Confidence levels of 95%

2 Test Configuration of EUT

2.1 Test Condition

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

2.2 Test Channel Mode



Test Software	Putty
---------------	-------

Mode	Power Setting
BT-LE(1Mbps)	-
2402MHz	default
2440MHz	default
2480MHz	default

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	Normal Link
1	FAP-U321EV + WiFi 2.4G+5G+BT , USB R/W + LAN 1Gbps (LAN1 & LAN2) + ADAPTER
2	FAP-U321EV + WiFi 2.4G+5G+BT , USB R/W + LAN 1Gbps (LAN2) + PoE Adapter(LAN1)
3	FAP-U321EV + WiFi 2.4G+5G+BT , USB R/W + LAN 1Gbps (LAN1) + PoE Adapter(LAN2)
4	FAP-U323EV+ WiFi 2.4G+5G+BT , USB R/W + LAN 1Gbps (LAN1 & LAN2) + ADAPTER
Mode 4 configuration was tested and found to be the worst case and measured during the test.	

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	CTX	
1	Adapter mode <FAP-U323EV>	
Orthogonal Planes of EUT	Y Plane	Z Plane
		
Worst Planes of EUT		V

The Worst Case Mode for Following Conformance Tests	
Tests Item	Simultaneous Transmission Analysis
Test Condition	Radiated measurement
Operating Mode	CTX
1	Adapter mode <FAP-U323EV>
Refer to Sporton Test Report No.: FA751119 for Co-location RF Exposure Evaluation and Appendix G for Radiated Emission Co-location.	

2.4 Support Equipment

Support Equipment – AC Conduction				
No.	Equipment	Brand Name	Model Name	FCC ID
A	Adapter	NETGEAR	2ABL030F	DoC
B	USB 3.0 Flash Disk	Kingston	DTSE9G2/16GBFR	DoC
Z	Notebook	DELL	VOSTRO 3350	DoC
Z	Notebook	DELL	E5430	DoC
Z	Notebook1(5G)	DELL	P55G	DoC
Z	Notebook2(2.4G)	DELL	VOSTRO 3350	DoC

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

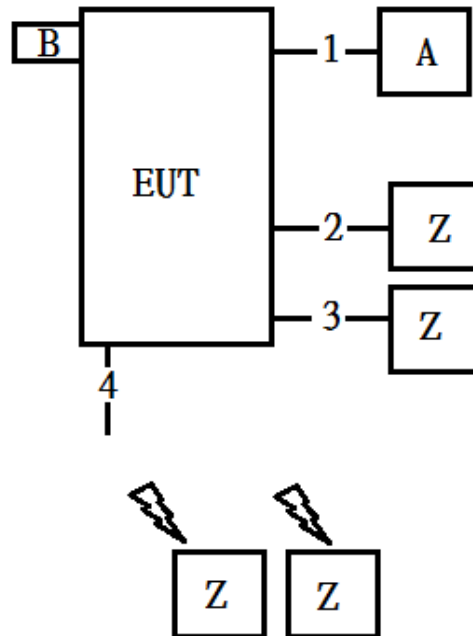
Support Equipment – Radiated Emission < 1GHz				
No.	Equipment	Brand Name	Model Name	FCC ID
-	-	-	-	-

Support Equipment – Radiated Emission > 1GHz				
No.	Equipment	Brand Name	Model Name	FCC ID
1	AC Adapter for EUT	APD	WA-30J12R	-

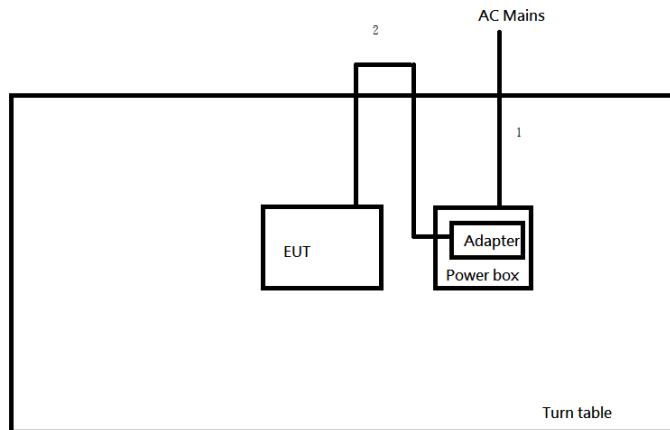
Note: Support equipment No.1 was provided by customer.

2.5 Test Setup Diagram

Test Setup Diagram – AC Line Conducted Emission Test



Item	Connection	Shielded	Length
1	DC power cable	No	1.8m
2	RJ45 Cable	No	10m
3	RJ45 Cable	No	10m
4	console(Floating)	No	1.8m

Test Setup Diagram - Radiated Test


Item	Connection	Shielded	Length
1	AC Power Line	No	1.8m
2	DC 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.

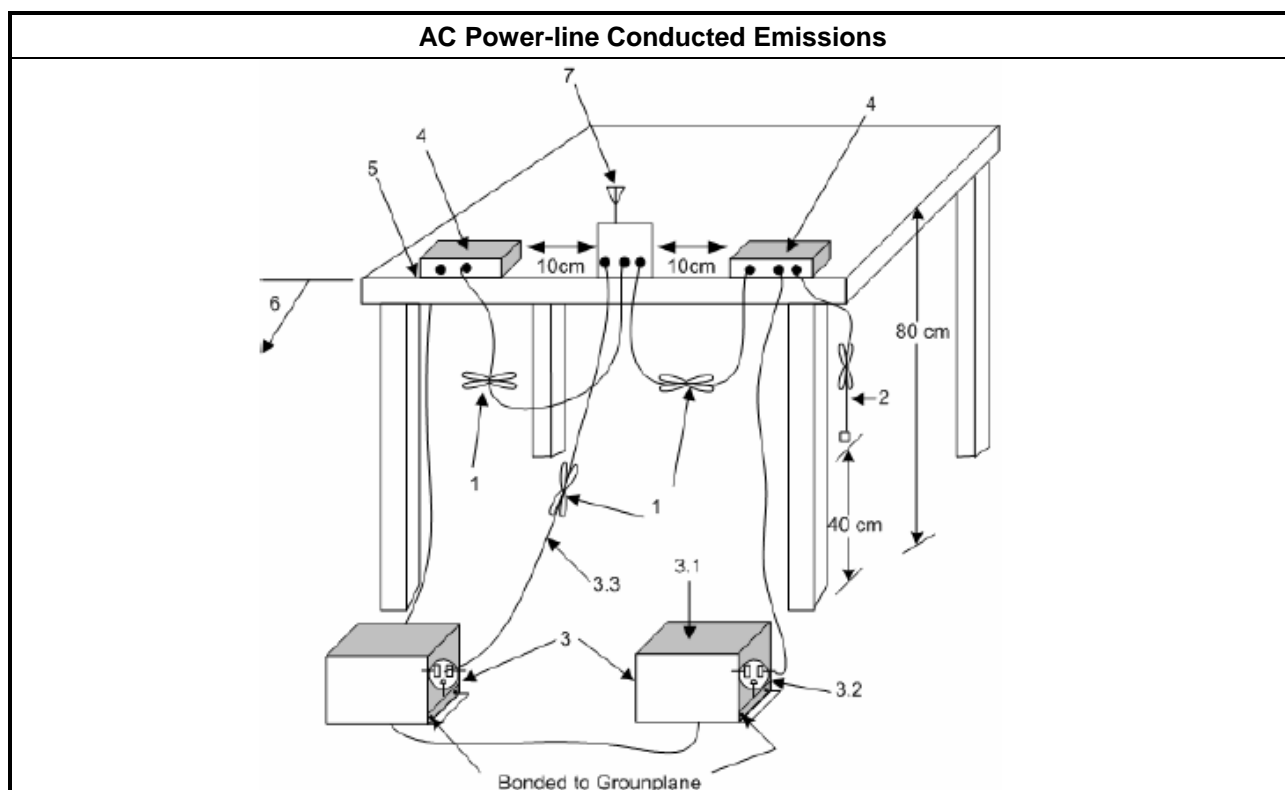
3.1.2 Measuring Instruments

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"> Refer as ANSI C63.10-2013, clause 6.2 foray power-line conducted emissions.

3.1.4 Test Setup



3.1.5 Test Result of AC Power-line Conducted Emissions

Refer as Appendix A

3.2 DTS Bandwidth

3.2.1 6dB Bandwidth Limit

6dB Bandwidth Limit	
Systems using digital modulation techniques:	
▪	6 dB bandwidth \geq 500 kHz.

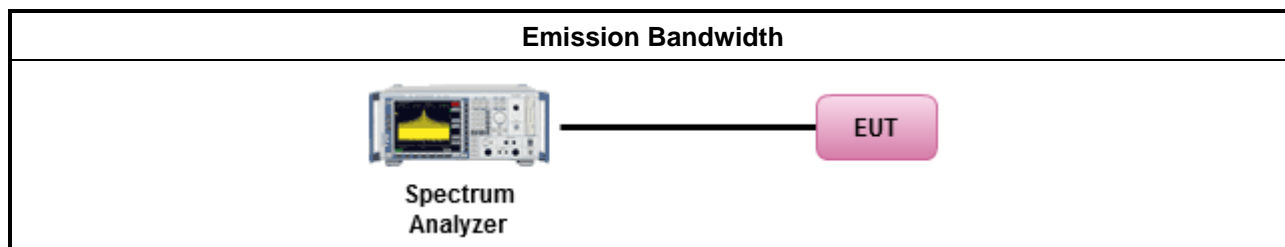
3.2.2 Measuring Instruments

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

3.2.3 Test Procedures

Test Method	
▪	For the emission bandwidth shall be measured using one of the options below:
<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.

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		
	▪	If $G_{TX} \leq 6$ dBi, then $P_{Out} \leq 30$ dBm (1 W)
	▪	Point-to-multipoint systems (P2M): If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)$ dBm
	▪	Point-to-point systems (P2P): If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)/3$ dBm
	▪	Smart antenna system (SAS):
	-	Single beam: If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)/3$ dBm
	-	Overlap beam: If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)/3$ dBm
	-	Aggregate power on all beams: If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)/3 + 8$ dB dBm
e.i.r.p. Power Limit:		
	▪	2400-2483.5 MHz Band
	▪	Point-to-multipoint systems (P2M): $P_{eirp} \leq 36$ dBm (4 W)
	▪	Point-to-point systems (P2P): $P_{eirp} \leq \text{MAX}(36, [P_{Out} + G_{TX}])$ dBm
	▪	Smart antenna system (SAS)
	-	Single beam: $P_{eirp} \leq \text{MAX}(36, P_{Out} + G_{TX})$ dBm
	-	Overlap beam: $P_{eirp} \leq \text{MAX}(36, P_{Out} + G_{TX})$ dBm
	-	Aggregate power on all beams: $P_{eirp} \leq \text{MAX}(36, [P_{Out} + G_{TX} + 8])$ dBm
P_{Out} = maximum peak conducted output power or maximum conducted output power in dBm, G_{TX} = the maximum transmitting antenna directional gain in dBi.		

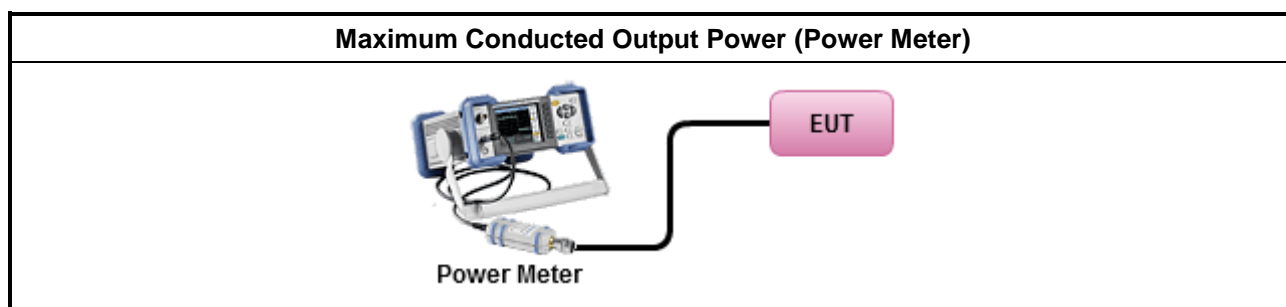
3.3.2 Measuring Instruments

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"> Maximum Peak Conducted Output Power 	
<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"> Maximum Average Conducted Output Power 	
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"> For conducted measurement. 	
<ul style="list-style-type: none"> 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. 	
<ul style="list-style-type: none"> If multiple transmit chains, EIRP calculation could be following as methods: $P_{total} = P_1 + P_2 + \dots + P_n$ (calculated in linear unit [mW] and transfer to log unit [dBm]) $EIRP_{total} = P_{total} + DG$ 	

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	
▪	Power Spectral Density (PSD) ≤ 8 dBm/3kHz

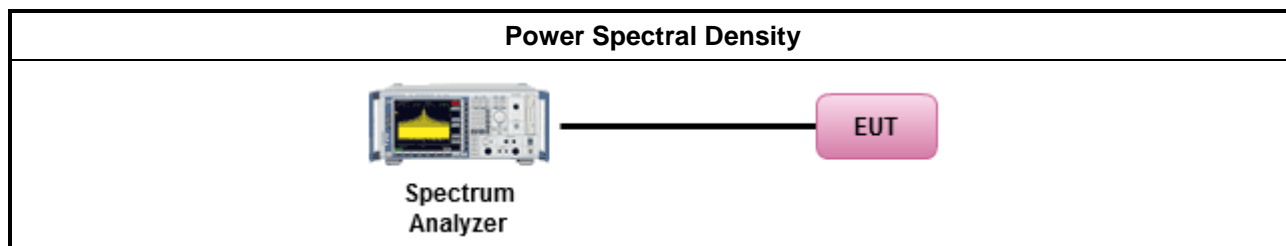
3.4.2 Measuring Instruments

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

3.4.3 Test Procedures

Test Method	
▪	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).
<input checked="" type="checkbox"/>	Refer as KDB 558074, clause 10.2 Method PKPSD (RBW=3-100kHz; Detector=peak).
▪	For conducted measurement.
▪	If The EUT supports multiple transmit chains using options given below:
<input type="checkbox"/>	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.

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
<p>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.</p> <p>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.</p>	

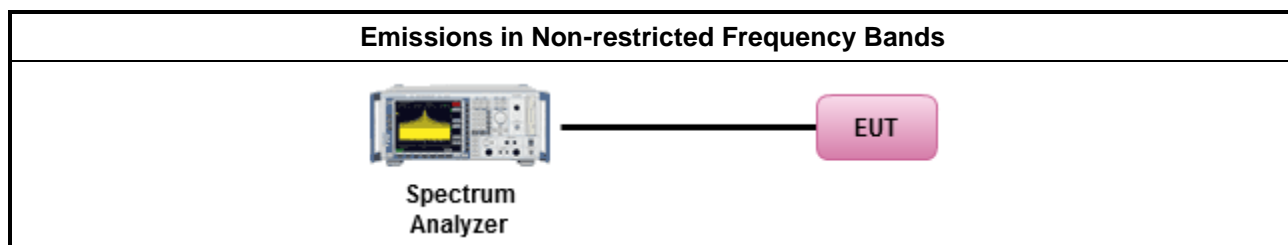
3.5.2 Measuring Instruments

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"> Refer as KDB 558074, clause 11 for unwanted emissions into non-restricted bands.

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.

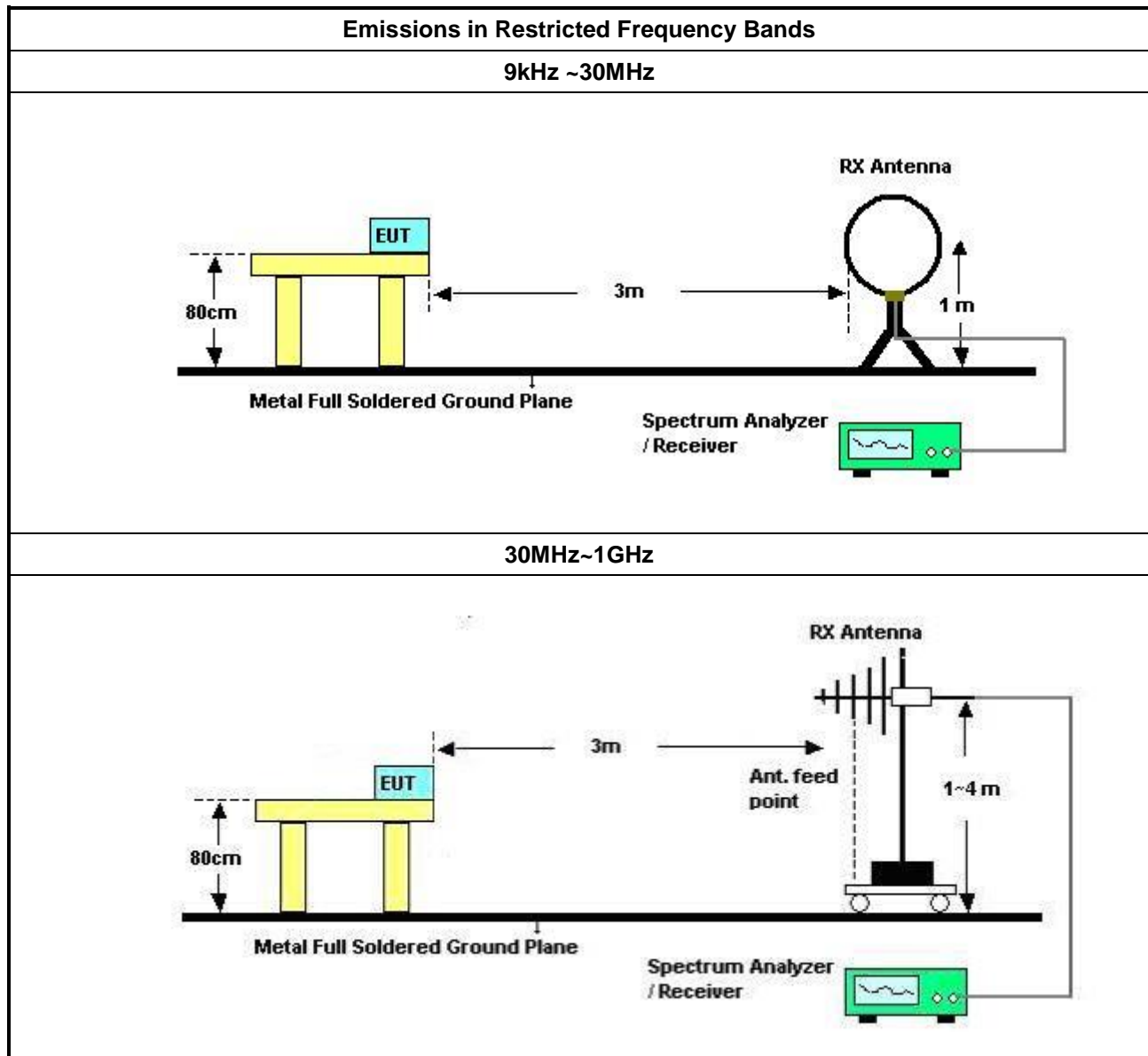
3.6.2 Measuring Instruments

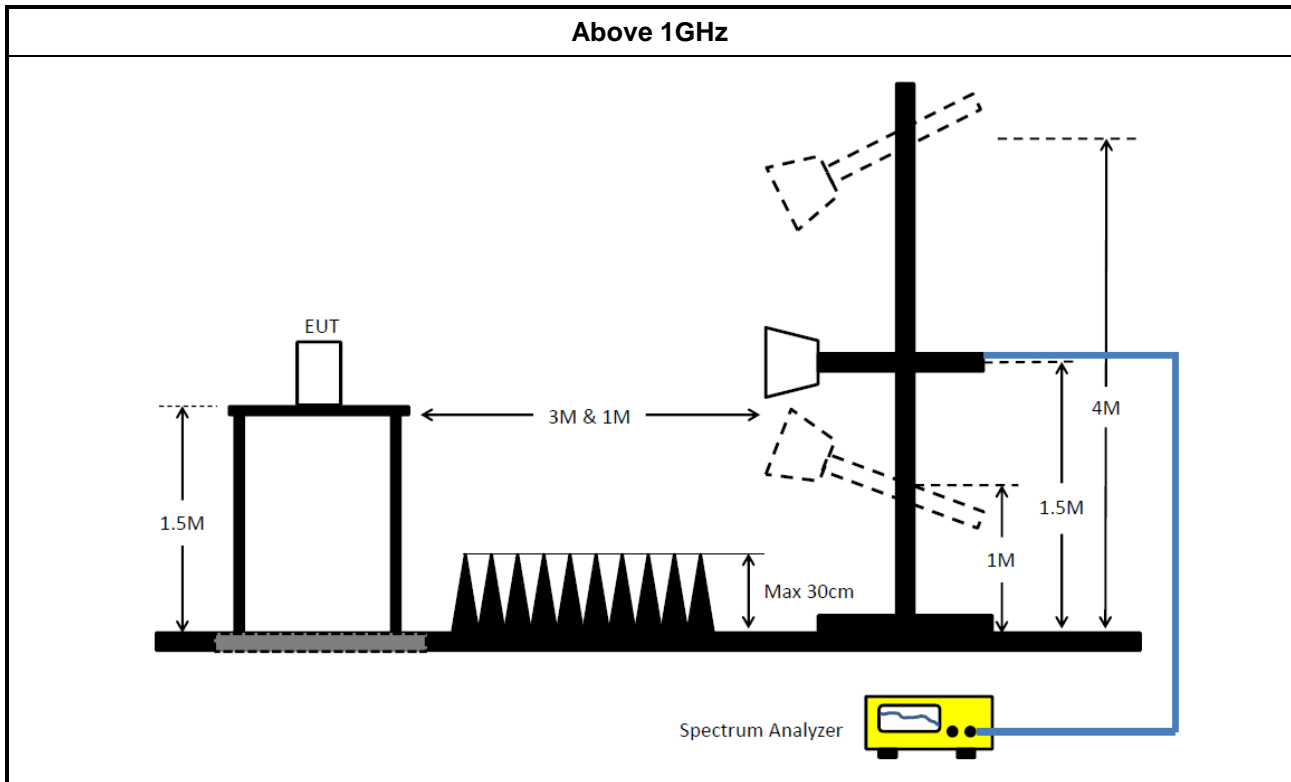
Refer a test equipment and calibration data table in this test report.

3.6.3 Test Procedures

Test Method	
<ul style="list-style-type: none"> The average emission levels shall be measured in [duty cycle ≥ 98 or duty factor]. 	
<ul style="list-style-type: none"> 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. 	
<ul style="list-style-type: none"> For the transmitter unwanted emissions shall be measured using following options below: 	
	<ul style="list-style-type: none"> Refer as KDB 558074, clause 12 for unwanted emissions into restricted bands.
	<input checked="" type="checkbox"/> Refer as KDB 558074, clause 12.2.5.3 (ANSI C63.10, clause 4.1.4.2.3), Reduced VBW $\geq 1/T$.
	<input checked="" type="checkbox"/> Refer as KDB 558074, clause 12.2.4 measurement procedure peak limit.
<ul style="list-style-type: none"> For the transmitter band-edge emissions shall be measured using following options below: 	
	<ul style="list-style-type: none"> 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.
	<ul style="list-style-type: none"> Refer as KDB 558074, clause 13.2 (ANSI C63.10, clause 6.10.6) for marker-delta method for band-edge measurements.
	<ul style="list-style-type: none"> 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).
<ul style="list-style-type: none"> For conducted and cabinet radiation measurement, refer as KDB 558074, clause 12.2.2. 	
	<ul style="list-style-type: none"> 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
	<ul style="list-style-type: none"> 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.

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. All amplitude of spurious emissions that are attenuated by more than 20 dB 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	102051	9kHz ~ 3.6GHz	29/Apr/2017	28/Apr/2018
LISN	R&S	ENV216	101295	9kHz ~ 30MHz	15/Nov/2016	14/Nov/2017
RF Cable-CON	HUBER+SUHNER	RG213/U	07611832020001	9kHz ~ 30MHz	24/Oct/2016	23/Oct/2017
Impedance Stabilization Network	TESEQ	ISN T800	30330	9kHz ~ 30MHz	13/Apr/2017	12/Apr/2018
Impuls Begrenzer Pulse Limiter	R&S	ESH3-Z2	100921	10 kHz ~ 30 MHz	20/Oct/2016	19/Oct/2017

Instrument for Conducted Test

Instrument	Manufacturer	Model No.	Serial No.	Spec.	Calibration Date	Calibration Due Date
Spectrum Analyzer	R&S	FSV 40	101013	10Hz~40GHz	30/Dec/2016	29/Dec/2017
Power Sensor	Anritsu	MA2411B	1027452	300MHz ~ 40GHz	24/Feb/2017	23/Feb/2018
Power Meter	Anritsu	ML2495A	1124009	300MHz ~ 40GHz	24/Feb/2017	23/Feb/2018
Signal Generator	R&S	SMR40	100116	10MHz ~ 40GHz	21/Jul/2016	20/Jul/2017
RF Cable-0.2m	HUBER+SUHNER	SUCOFLEX_104	MY677/3	30MHz~26.5GHz	02/Oct/2016	01/Oct/2017
RF Cable-0.2m	HUBER+SUHNER	SUCOFLEX_104	MY678/3	30MHz~26.5GHz	02/Oct/2016	01/Oct/2017
RF Cable-0.5m	HUBER+SUHNER	SUCOFLEX_104	MY10717/4	30MHz~26.5GHz	02/Oct/2016	01/Oct/2017

Instrument for Radiated Test < 1GHz

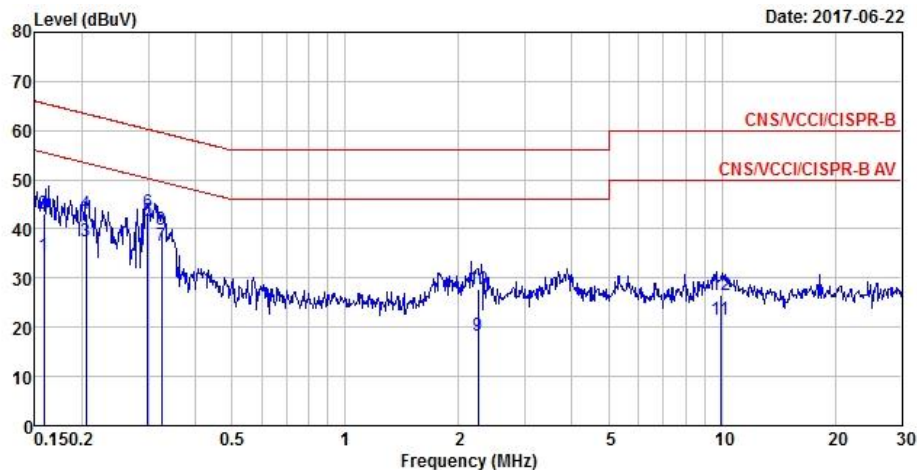
Instrument	Manufacturer	Model No.	Serial No.	Spec.	Calibration Date	Calibration Due Date
3m Semi Anechoic Chamber	TDK	SAC-3M	03CH09-HY	30MHz ~ 1GHz	25/Apr/2017	24/Apr/2018
Amplifier	EMC	EMC9135	980232	9KHz~1GHz	25/Apr/2017	24/Apr/2018
Spectrum Analyzer	KEYSIGHT	N9010A	MY54200885	10Hz ~ 44GHz	20/Jul/2017	19/Jul/2018
Bilog Antenna	TESEQ	CBL 6111D	35418	30MHz~1GHz	01/Oct/2016	30/Sep/2017
Loop Antenna	R&S	HFH2-Z2	100330	9 kHz~30 MHz	10/Nov/2016	09/Nov/2017
RF Cable-R03m	Jye Bao	RG142	CB021	9kHz ~ 1GHz	02/Feb/2017	01/Feb/2018
Receiver	R&S	ESU-26	100422/026	20Hz ~ 26.5GHz	21/Sep/2016	20/Sep/2017

Instrument for Radiated Test > 1GHz

Instrument	Manufacturer	Model No.	Serial No.	Spec.	Calibration Date	Calibration Due Date
3m Semi Anechoic Chamber	TDK	SAC-3M	03CH09-HY	1GHz ~ 18GHz	18/Jun/2017	17/Jun/2018
Amplifier	Agilent	8449B	3008A02096	1GHz ~ 26.5GHz	25/Apr/2017	24/Apr/2018
Spectrum Analyzer	KEYSIGHT	N9010A	MY54200885	10Hz ~ 44GHz	04/Jul/2016	03/Jul/2017
Horn Antenna	SCHWARZBECK	BBHA 9120D	BBHA9120D 1534	1GHz~18GHz	28/Apr/2017	27/Apr/2018
Horn Antenna	SCHWARZBECK	BBHA9170	BBHA9170614	18GHz ~ 40GHz	06/Feb/2017	05/Feb/2018
RF Cable-high	Jye Bao	RG142	03CH09-HY	1GHz ~ 40GHz	23/Jul/2016	22/Jul/2017

AC Power-line Conducted Emissions Result

Operating Mode	4	Power Phase	Neutral
Operating Function	FAP-U323EV+ WiFi 2.4G+5G+BT , USB R/W + LAN 1Gbps (LAN1 & LAN2) + ADAPTER		

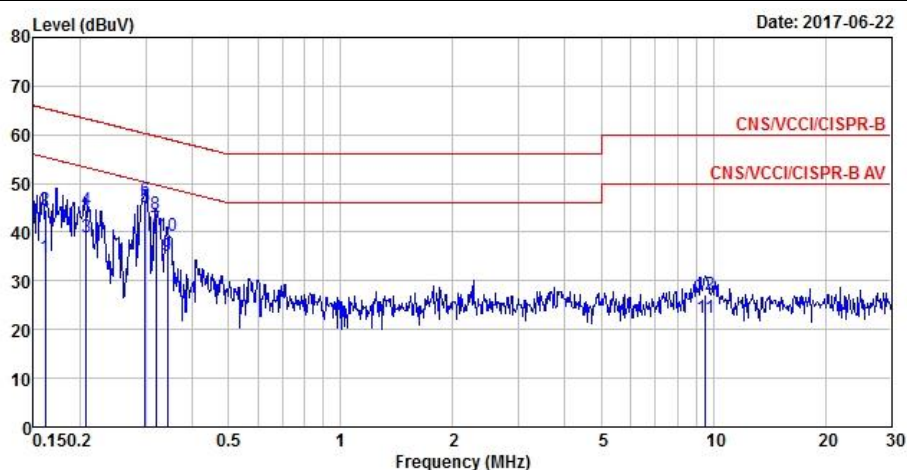


	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.16	34.61	-20.95	55.56	24.77	9.61	0.23	Average
2	0.16	43.23	-22.33	65.56	33.39	9.61	0.23	QP
3	0.21	37.60	-15.80	53.40	27.64	9.67	0.29	Average
4	0.21	43.14	-20.26	63.40	33.18	9.67	0.29	QP
5 MAX	0.30	41.70	-8.58	50.28	31.87	9.65	0.18	Average
6	0.30	43.46	-16.82	60.28	33.63	9.65	0.18	QP
7	0.33	36.67	-12.90	49.57	26.87	9.64	0.16	Average
8	0.33	39.77	-19.80	59.57	29.97	9.64	0.16	QP
9	2.25	18.44	-27.56	46.00	8.51	9.66	0.27	Average
10	2.25	27.61	-28.39	56.00	17.68	9.66	0.27	QP
11	9.91	21.46	-28.54	50.00	11.52	9.74	0.20	Average
12	9.91	26.43	-33.57	60.00	16.49	9.74	0.20	QP

Note 1: ">20dB" means emission levels that exceed the level of 20 dB below the applicable limit.
Note 2: "N/F" means Nothing Found emissions (No emissions were detected.)

AC Power-line Conducted Emissions Result

Operating Mode	4	Power Phase	Line
Operating Function	FAP-U323EV+ WiFi 2.4G+5G+BT , USB R/W + LAN 1Gbps (LAN1 & LAN2) + ADAPTER		



	Freq	Level	Over	Limit	Read	LISN	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
			dB	dBuV	dBuV	dB	dB	
1	0.16	34.98	-20.40	55.38	25.08	9.66	0.24	Average
2	0.16	44.69	-20.69	65.38	34.79	9.66	0.24	QP
3	0.21	38.85	-14.47	53.32	28.91	9.65	0.29	Average
4	0.21	44.62	-18.70	63.32	34.68	9.65	0.29	QP
5 MAX	0.30	45.06	-5.22	50.28	35.21	9.67	0.18	Average
6	0.30	46.63	-13.65	60.28	36.78	9.67	0.18	QP
7	0.32	40.73	-8.98	49.71	30.89	9.67	0.17	Average
8	0.32	43.84	-15.87	59.71	34.00	9.67	0.17	QP
9	0.34	35.22	-13.91	49.13	25.41	9.67	0.14	Average
10	0.34	39.36	-19.77	59.13	29.55	9.67	0.14	QP
11	9.55	22.31	-27.69	50.00	12.38	9.74	0.19	Average
12	9.55	27.29	-32.71	60.00	17.36	9.74	0.19	QP

Note 1: ">20dB" means emission levels that exceed the level of 20 dB below the applicable limit.

Note 2: "N/F" means Nothing Found emissions (No emissions were detected.)

Summary

Mode	Max-N dB (Hz)	Max-OBW (Hz)	ITU-Code	Min-N dB (Hz)	Min-OBW (Hz)
BT-LE(1Mbps)	-	-	-	-	-
2.4-2.4835GHz	720k	1.058M	1M06F1D	708.75k	1.056M

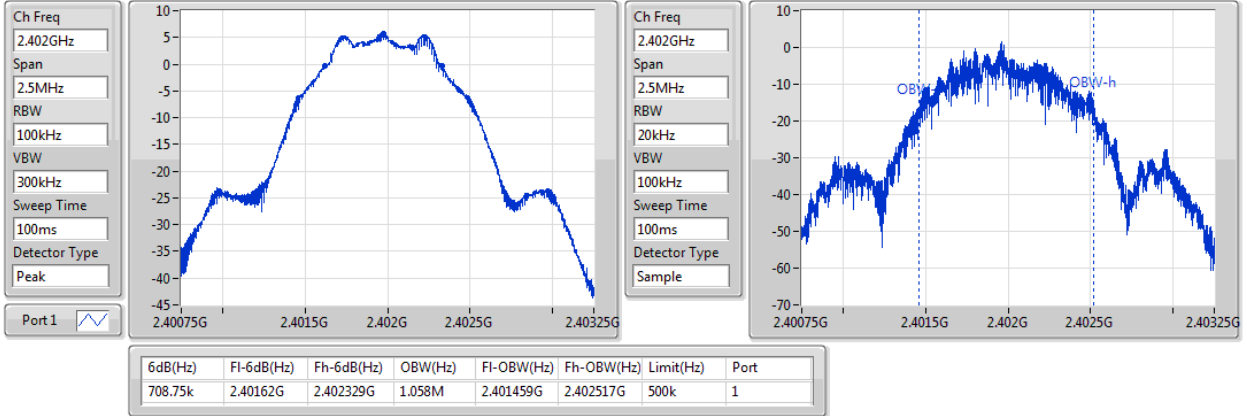
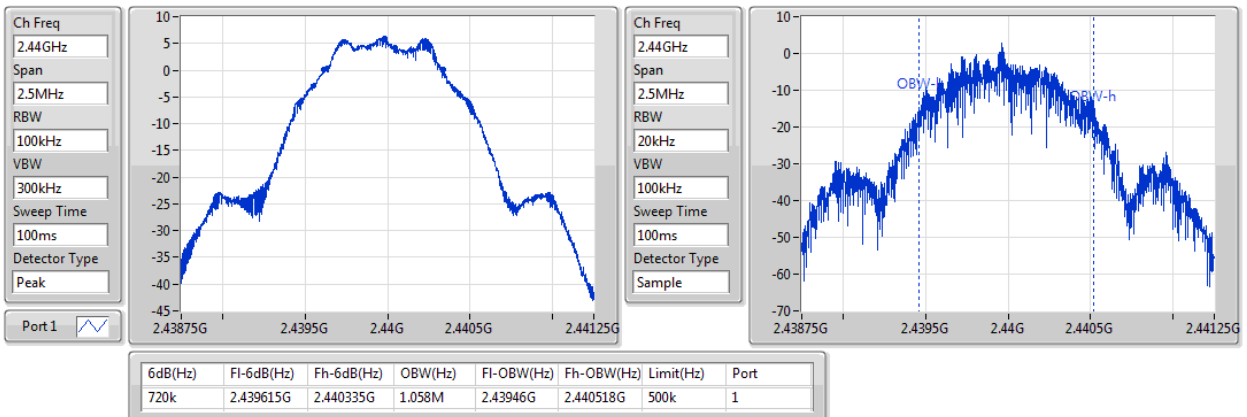
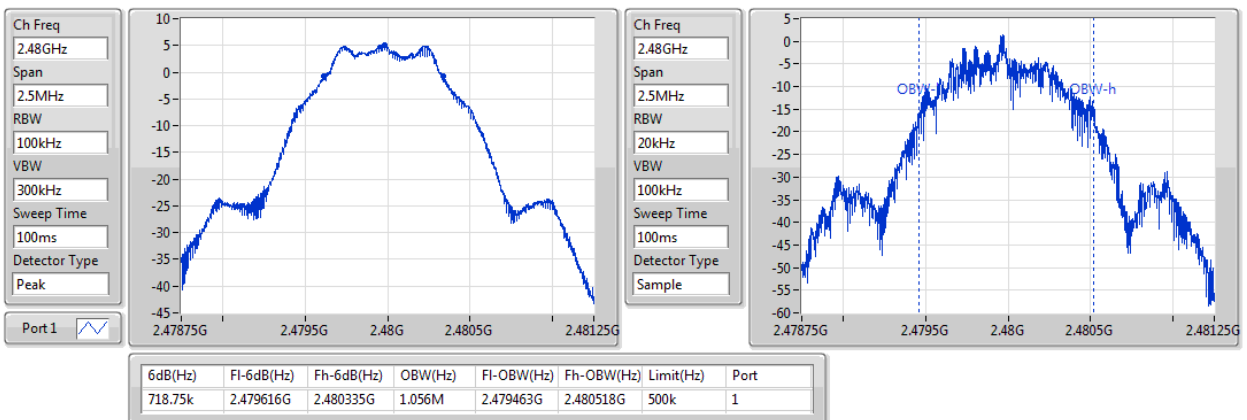
Max-N dB = Maximum 6dB down bandwidth; **Max-OBW** = Maximum 99% occupied bandwidth;

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	708.75k	1.058M
2440MHz_TnomVnom	Pass	500k	720k	1.058M
2480MHz_TnomVnom	Pass	500k	718.75k	1.056M

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

BT-LE(1Mbps)
EBW
2402MHz

BT-LE(1Mbps)
EBW
2440MHz

BT-LE(1Mbps)
EBW
2480MHz


Summary

Mode	Power	Power
	(dBm)	(W)
BT-LE(1Mbps)	-	-
2.4-2.4835GHz	6.34	0.00431

Result

Mode	Result	Gain (dBi)	Power (dBm)	Power Limit (dBm)
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	4.50	6.04	21.00
2440MHz	Pass	4.50	6.34	21.00
2480MHz	Pass	4.50	5.44	21.00

Summary

Mode	PD (dBm/RBW)
BT-LE(1Mbps)	-
2.4-2.4835GHz	-7.16

RBW=3kHz.

Result

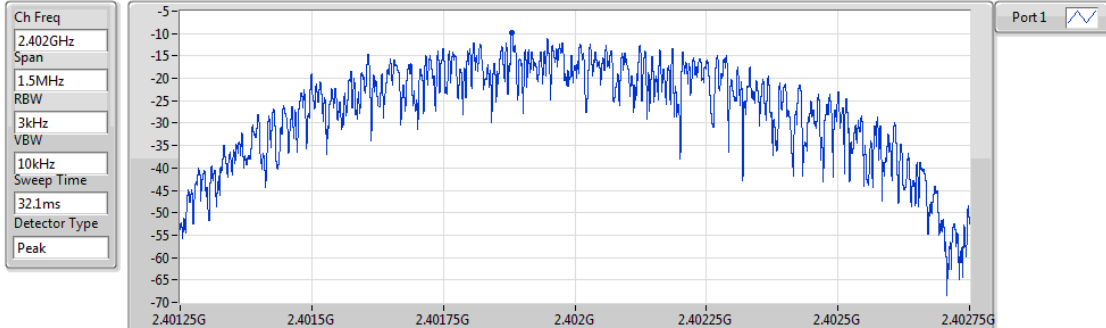
Mode	Result	Gain (dBi)	PD (dBm/RBW)	PD Limit (dBm/RBW)
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	4.50	-9.71	8.00
2440MHz	Pass	4.50	-7.16	8.00
2480MHz	Pass	4.50	-8.69	8.00

RBW=3kHz.

BT-LE(1Mbps)

PSD

2402MHz

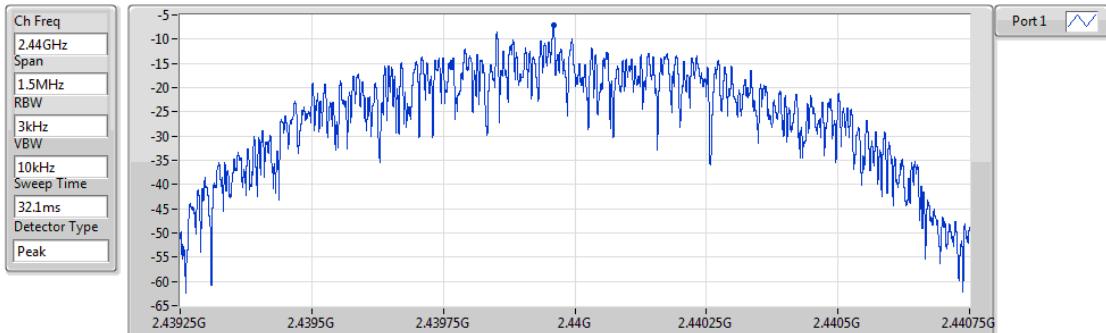


Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-9.71	-9.71	-9.71

BT-LE(1Mbps)

PSD

2440MHz

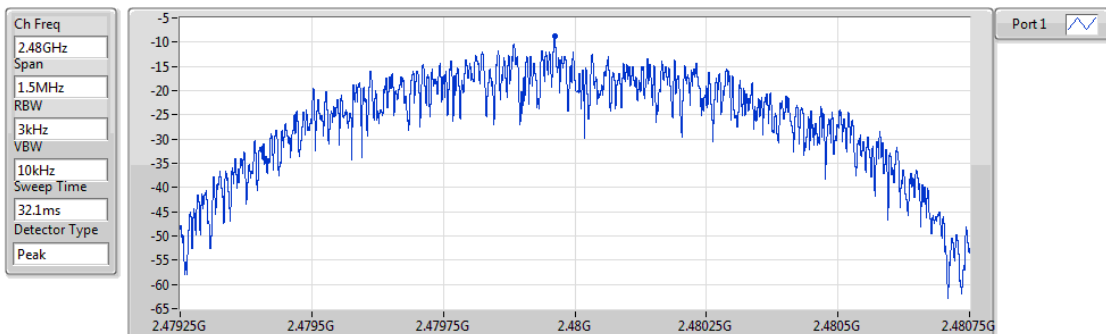


Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-7.16	-7.16	-7.16

BT-LE(1Mbps)

PSD

2480MHz



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-8.69	-8.69	-8.69

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
BT-LE(1Mbps)	-	-	-	-	-	-	-	-	-	-	-	-	-
2.4-2.4835GHz	Pass	2.439913G	5.08	-24.92	1.881776G	-57.79	2.399984G	-51.47	2.484684G	-55.99	6.78577G	-51.81	1

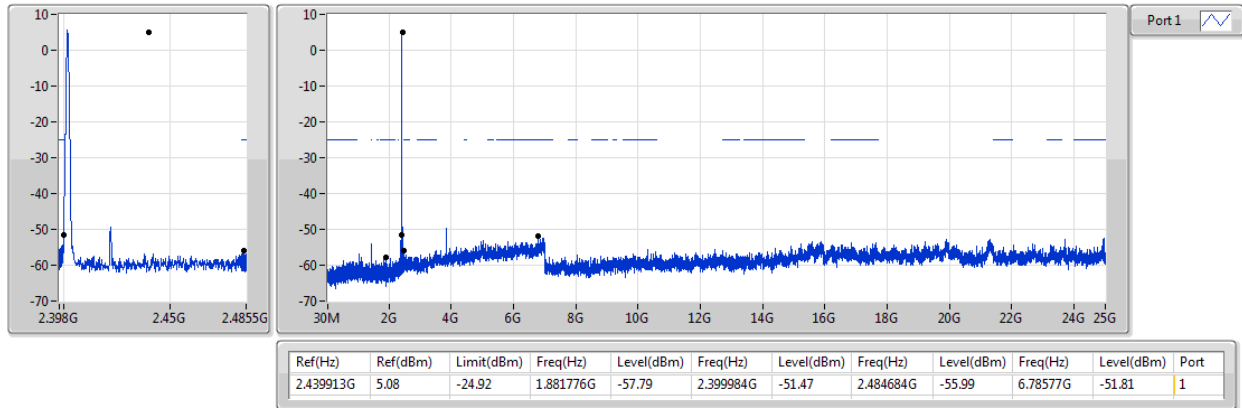
Result

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	2.439913G	5.08	-24.92	1.881776G	-57.79	2.399984G	-51.47	2.484684G	-55.99	6.78577G	-51.81	1
2440MHz_TnomVnom	Pass	2.439913G	5.08	-24.92	2.033328G	-57.48	2.3999G	-56.65	2.483508G	-57.10	6.946185G	-52.25	1
2480MHz_TnomVnom	Pass	2.439913G	5.08	-24.92	2.306832G	-57.88	2.399948G	-56.21	2.484176G	-54.11	6.957443G	-52.47	1

BT-LE(1Mbps)

CSE NdB

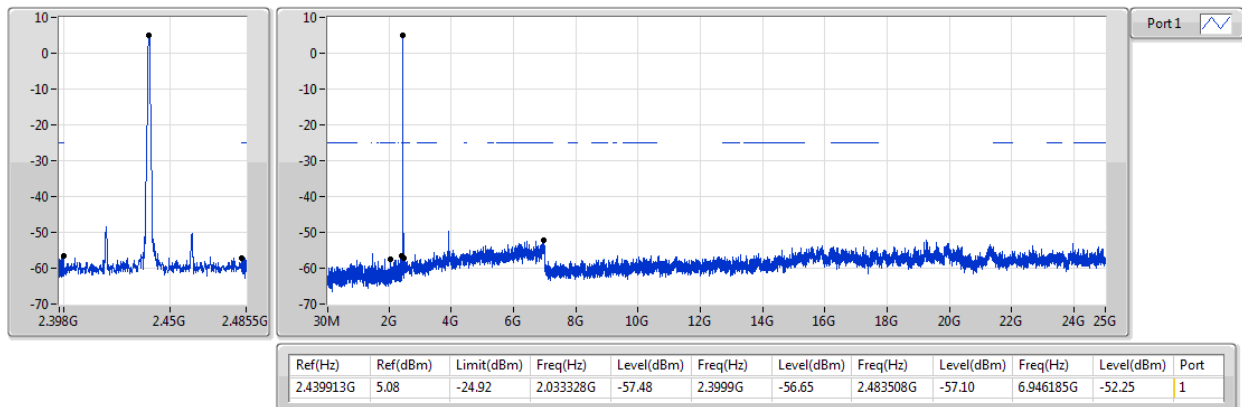
2402MHz



BT-LE(1Mbps)

CSE NdB

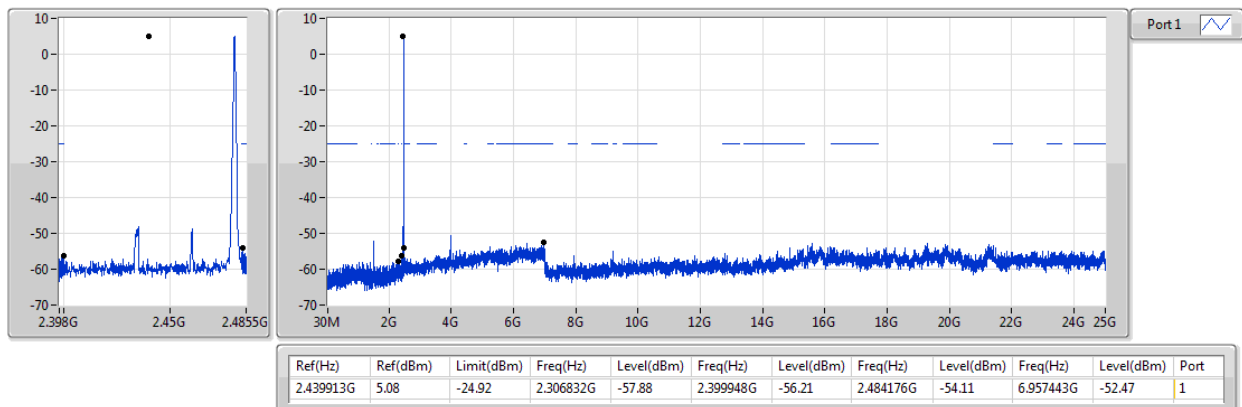
2440MHz



BT-LE(1Mbps)

CSE NdB

2480MHz



Summary

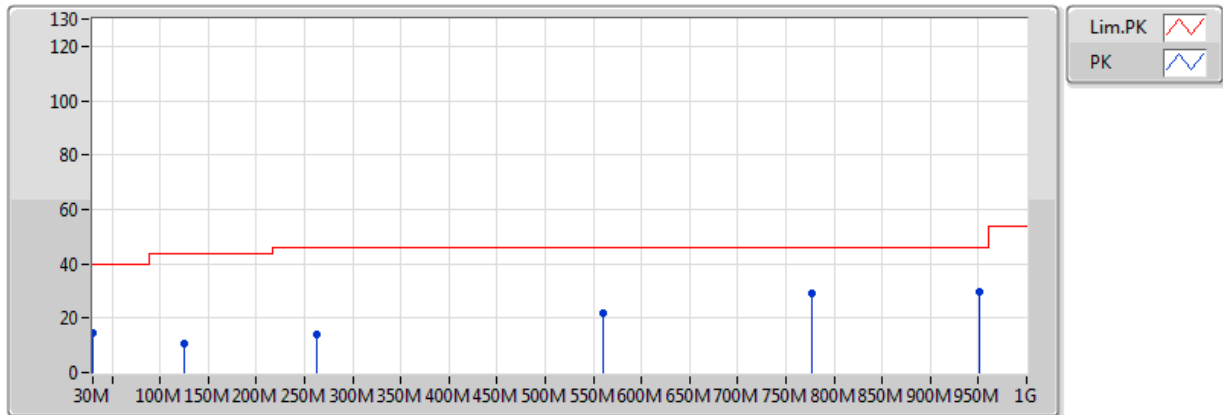
Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-	-
BT-LE(1Mbps)	Pass	PK	776.9M	32.43	46.00	-13.57	-5.78	3	Horizontal	360	1.00	-

Result

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
BT-LE(1Mbps)	-	-	-	-	-	-	-	-	-	-	-	-
2440MHz	Pass	PK	134.76M	13.43	43.50	-30.07	-18.27	3	Horizontal	360	1.00	-
2440MHz	Pass	PK	239.52M	13.85	46.00	-32.15	-17.83	3	Horizontal	360	1.00	-
2440MHz	Pass	PK	288.02M	20.37	46.00	-25.63	-15.72	3	Horizontal	360	1.00	-
2440MHz	Pass	PK	547.98M	23.17	46.00	-22.83	-9.00	3	Horizontal	360	1.00	-
2440MHz	Pass	PK	776.9M	32.43	46.00	-13.57	-5.78	3	Horizontal	360	1.00	-
2440MHz	Pass	PK	926.28M	29.60	46.00	-16.40	-3.51	3	Horizontal	360	1.00	-
2440MHz	Pass	PK	30M	14.35	40.00	-25.65	-14.06	3	Vertical	0	1.00	-
2440MHz	Pass	PK	125.06M	10.71	43.50	-32.79	-18.32	3	Vertical	0	1.00	-
2440MHz	Pass	PK	262.8M	13.73	46.00	-32.27	-15.08	3	Vertical	0	1.00	-
2440MHz	Pass	PK	559.62M	21.75	46.00	-24.25	-8.03	3	Vertical	0	1.00	-
2440MHz	Pass	PK	776.9M	29.30	46.00	-16.70	-5.78	3	Vertical	0	1.00	-
2440MHz	Pass	PK	951.5M	29.73	46.00	-16.27	-2.41	3	Vertical	0	1.00	-

BT-LE(1Mbps)

2440MHz_Adapter

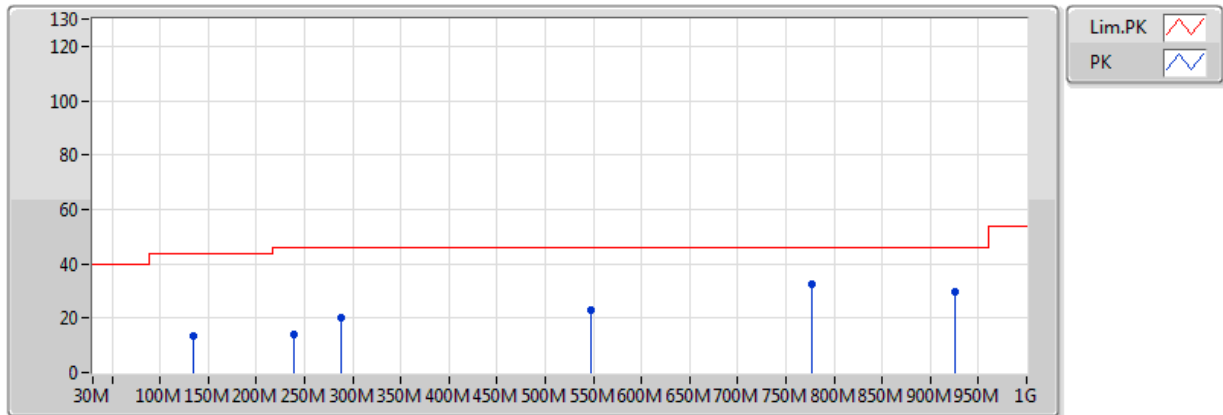


EUT = Z ANT = Y

Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comments	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
PK	30M	14.35	40.00	-25.65	-14.06	3	Vertical	0	1.00	-	28.41	22.34	0.94	37.34
PK	125.06M	10.71	43.50	-32.79	-18.32	3	Vertical	0	1.00	-	29.03	16.55	1.83	36.69
PK	262.8M	13.73	46.00	-32.27	-15.08	3	Vertical	0	1.00	-	28.81	18.67	2.67	36.42
PK	559.62M	21.75	46.00	-24.25	-8.03	3	Vertical	0	1.00	-	29.78	24.99	4.06	37.08
PK	776.9M	29.30	46.00	-16.70	-5.78	3	Vertical	0	1.00	-	35.08	26.91	4.76	37.45
PK	951.5M	29.73	46.00	-16.27	-2.41	3	Vertical	0	1.00	-	32.14	29.49	5.43	37.33

BT-LE(1Mbps)

2440MHz_Adapter



EUT = Z ANT = Y

Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comments	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
PK	134.76M	13.43	43.50	-30.07	-18.27	3	Horizontal	360	1.00	-	31.70	16.47	1.91	36.65
PK	239.52M	13.85	46.00	-32.15	-17.83	3	Horizontal	360	1.00	-	31.68	16.06	2.51	36.40
PK	288.02M	20.37	46.00	-25.63	-15.72	3	Horizontal	360	1.00	-	36.09	17.83	2.88	36.43
PK	547.98M	23.17	46.00	-22.83	-9.00	3	Horizontal	360	1.00	-	32.17	24.00	4.05	37.05
PK	776.9M	32.43	46.00	-13.57	-5.78	3	Horizontal	360	1.00	-	38.21	26.91	4.76	37.45
PK	926.28M	29.60	46.00	-16.40	-3.51	3	Horizontal	360	1.00	-	33.11	28.66	5.25	37.42

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	2.3822G	49.19	54.00	-4.81	31.14	3	V	21	3.61	-

Result

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)	-	-	-	-	-	-	-	-	-	-	-	-
2402MHz	Pass	AV	2.3822G	47.99	54.00	-6.01	31.14	3	H	121	3.08	-
2402MHz	Pass	AV	2.402G	94.94	Inf	-Inf	31.22	3	H	121	3.08	-
2402MHz	Pass	PK	2.3796G	58.42	74.00	-15.58	31.13	3	H	121	3.08	-
2402MHz	Pass	PK	2.4016G	96.69	Inf	-Inf	31.22	3	H	121	3.08	-
2402MHz	Pass	AV	2.3822G	49.19	54.00	-4.81	31.14	3	V	21	3.61	-
2402MHz	Pass	AV	2.4018G	100.42	Inf	-Inf	31.22	3	V	21	3.61	-
2402MHz	Pass	PK	2.3822G	57.87	74.00	-16.13	31.14	3	V	21	3.61	-
2402MHz	Pass	PK	2.4018G	102.07	Inf	-Inf	31.22	3	V	21	3.61	-
2402MHz	Pass	AV	4.804G	32.80	54.00	-21.20	2.46	3	H	360	1.50	-
2402MHz	Pass	PK	4.804G	45.92	74.00	-28.08	2.46	3	H	360	1.50	-
2402MHz	Pass	AV	4.804G	33.64	54.00	-20.36	2.46	3	V	360	1.50	-
2402MHz	Pass	PK	4.804G	45.69	74.00	-28.31	2.46	3	V	360	1.50	-
2440MHz	Pass	AV	2.3444G	47.98	54.00	-6.02	30.99	3	H	123	3.35	-
2440MHz	Pass	AV	2.44G	93.30	Inf	-Inf	31.36	3	H	123	3.35	-
2440MHz	Pass	AV	2.4868G	48.63	54.00	-5.37	31.54	3	H	123	3.35	-
2440MHz	Pass	PK	2.3724G	58.53	74.00	-15.47	31.10	3	H	123	3.35	-
2440MHz	Pass	PK	2.4396G	95.04	Inf	-Inf	31.36	3	H	123	3.35	-
2440MHz	Pass	PK	2.4884G	58.52	74.00	-15.48	31.55	3	H	123	3.35	-
2440MHz	Pass	AV	2.3796G	47.61	54.00	-6.39	31.13	3	V	28	2.82	-
2440MHz	Pass	AV	2.44G	99.99	Inf	-Inf	31.36	3	V	28	2.82	-
2440MHz	Pass	AV	2.498G	48.31	54.00	-5.69	31.58	3	V	28	2.82	-
2440MHz	Pass	PK	2.3572G	57.79	74.00	-16.21	31.04	3	V	28	2.82	-
2440MHz	Pass	PK	2.4396G	101.68	Inf	-Inf	31.36	3	V	28	2.82	-
2440MHz	Pass	PK	2.4968G	58.99	74.00	-15.01	31.58	3	V	28	2.82	-
2440MHz	Pass	AV	4.88G	34.73	54.00	-19.27	2.56	3	H	360	1.50	-
2440MHz	Pass	AV	7.32G	38.98	54.00	-15.02	8.43	3	H	0	1.50	-
2440MHz	Pass	PK	4.88G	45.90	74.00	-28.10	2.56	3	H	360	1.50	-
2440MHz	Pass	PK	7.32G	50.67	74.00	-23.33	8.43	3	H	0	1.50	-
2440MHz	Pass	AV	4.88G	33.38	54.00	-20.62	2.56	3	V	360	1.50	-
2440MHz	Pass	AV	7.32G	39.06	54.00	-14.94	8.43	3	V	0	1.50	-
2440MHz	Pass	PK	4.88G	46.24	74.00	-27.76	2.56	3	V	360	1.50	-
2440MHz	Pass	PK	7.32G	51.87	74.00	-22.13	8.43	3	V	0	1.50	-
2480MHz	Pass	AV	2.48G	93.27	Inf	-Inf	31.51	3	H	28	3.61	-
2480MHz	Pass	AV	2.4986G	48.46	54.00	-5.54	31.58	3	H	28	3.61	-
2480MHz	Pass	AV	2.4986G	48.46	54.00	-5.54	31.58	3	H	28	3.61	-
2480MHz	Pass	PK	2.4796G	95.06	Inf	-Inf	31.51	3	H	28	3.61	-
2480MHz	Pass	PK	2.4924G	58.18	74.00	-15.82	31.56	3	H	28	3.61	-
2480MHz	Pass	AV	2.48G	98.71	Inf	-Inf	31.51	3	V	15	3.04	-
2480MHz	Pass	AV	2.4996G	48.71	54.00	-5.29	31.59	3	V	15	3.04	-
2480MHz	Pass	PK	2.4796G	100.44	Inf	-Inf	31.51	3	V	15	3.04	-
2480MHz	Pass	PK	2.4926G	58.30	74.00	-15.70	31.56	3	V	15	3.04	-
2480MHz	Pass	AV	4.96G	33.61	54.00	-20.39	2.68	3	H	0	1.50	-
2480MHz	Pass	AV	7.44G	38.67	54.00	-15.33	8.59	3	H	360	1.50	-
2480MHz	Pass	PK	4.96G	44.53	74.00	-29.47	2.68	3	H	0	1.50	-
2480MHz	Pass	PK	7.44G	50.68	74.00	-23.32	8.59	3	H	360	1.50	-
2480MHz	Pass	AV	4.96G	33.05	54.00	-20.95	2.68	3	V	360	1.50	-
2480MHz	Pass	AV	7.44G	38.70	54.00	-15.30	8.59	3	V	0	1.50	-
2480MHz	Pass	PK	4.96G	44.93	74.00	-29.07	2.68	3	V	360	1.50	-



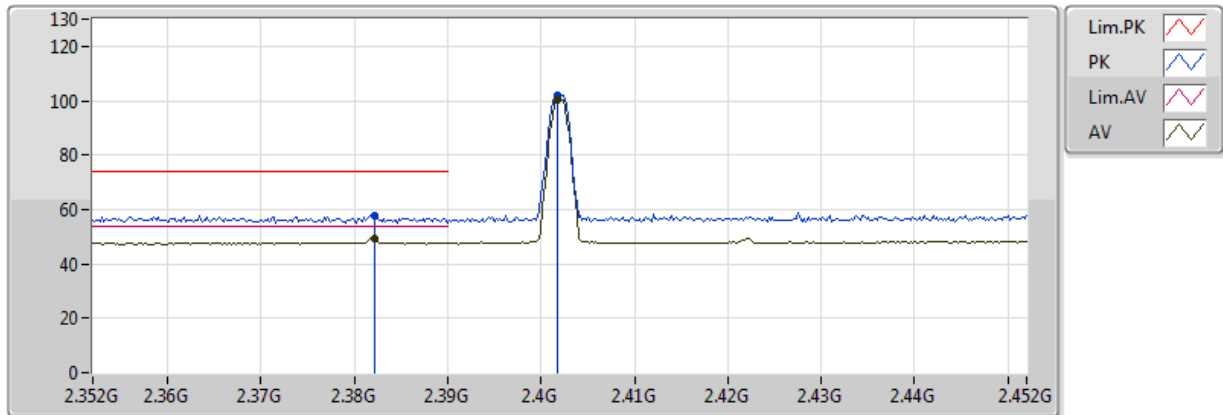
RSE TX above 1GHz Result

Appendix F.2

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Pol. (H/V)	Azimuth (°)	Height (m)	Comments
2480MHz	Pass	PK	7.44G	50.16	74.00	-23.84	8.59	3	V	0	1.50	-

BT-LE(1Mbps)

2402MHz_TX

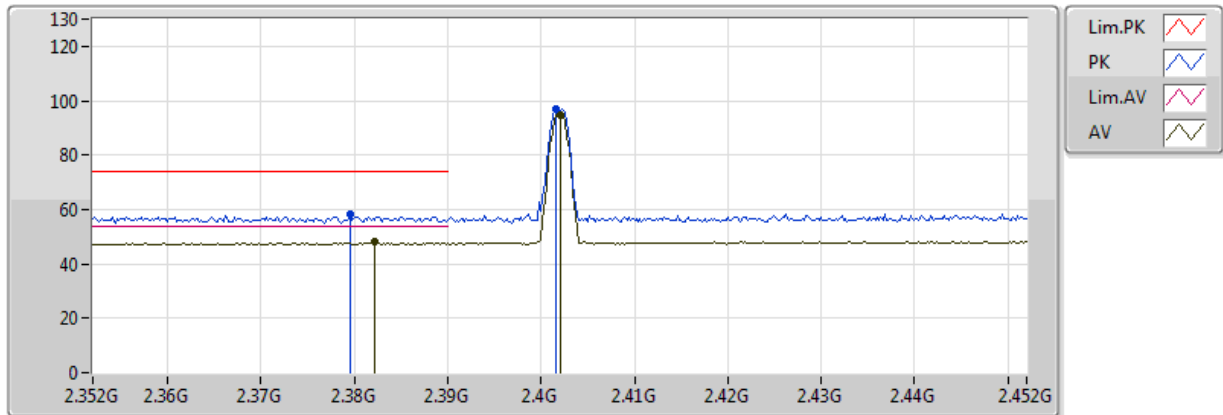


EUT : Z axis ANT : Z axis

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	2.3822G	49.19	54.00	-4.81	31.14	3	V	21	3.61	-
AV	2.4018G	100.42	Inf	-Inf	31.22	3	V	21	3.61	-
PK	2.3822G	57.87	74.00	-16.13	31.14	3	V	21	3.61	-
PK	2.4018G	102.07	Inf	-Inf	31.22	3	V	21	3.61	-

BT-LE(1Mbps)

2402MHz_TX

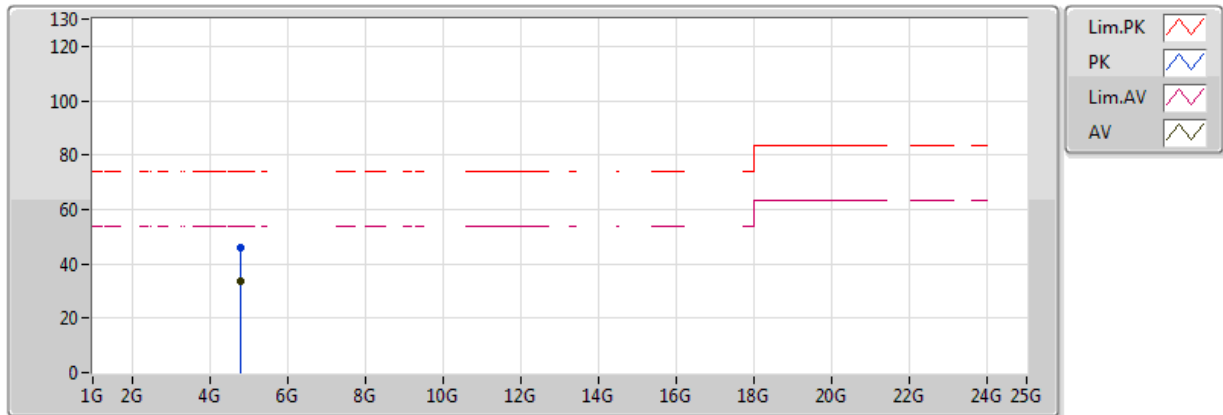


EUT : Z axis ANT : Z axis

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	2.3822G	47.99	54.00	-6.01	31.14	3	H	121	3.08	-
AV	2.402G	94.94	Inf	-Inf	31.22	3	H	121	3.08	-
PK	2.3796G	58.42	74.00	-15.58	31.13	3	H	121	3.08	-
PK	2.4016G	96.69	Inf	-Inf	31.22	3	H	121	3.08	-

BT-LE(1Mbps)

2402MHz_TX

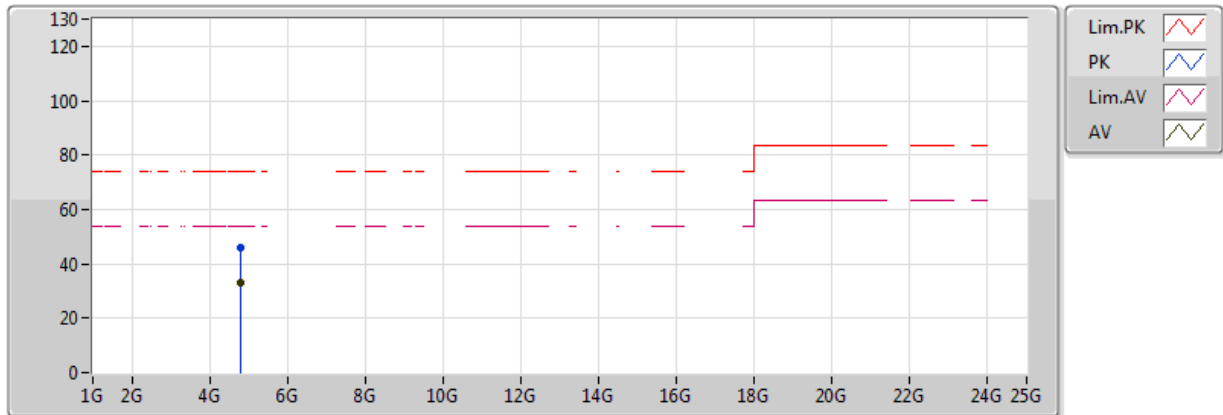


EUT : Z axis ANT : Z axis

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	4.804G	33.64	54.00	-20.36	2.46	3	V	360	1.50	-
PK	4.804G	45.69	74.00	-28.31	2.46	3	V	360	1.50	-

BT-LE(1Mbps)

2402MHz_TX

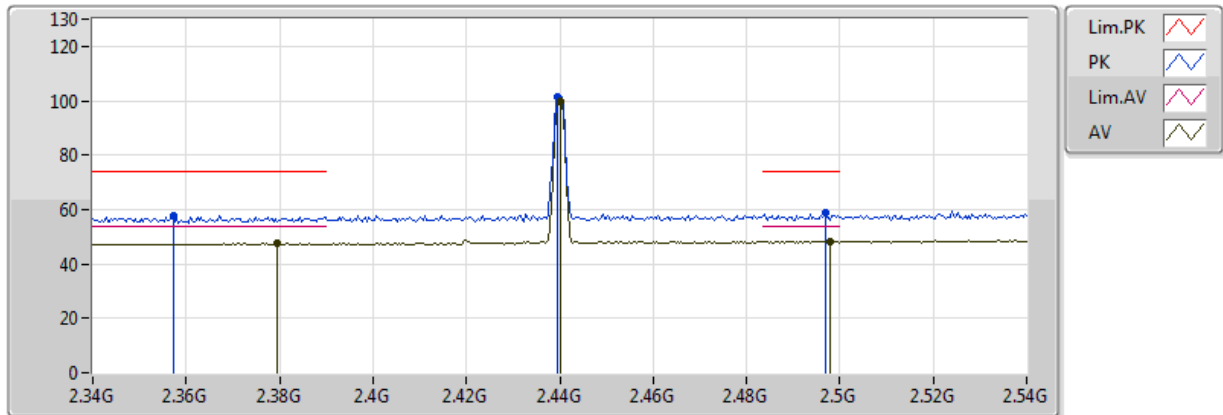


EUT : Z axis ANT : Z axis

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	4.804G	32.80	54.00	-21.20	2.46	3	H	360	1.50	-
PK	4.804G	45.92	74.00	-28.08	2.46	3	H	360	1.50	-

BT-LE(1Mbps)

2440MHz_TX

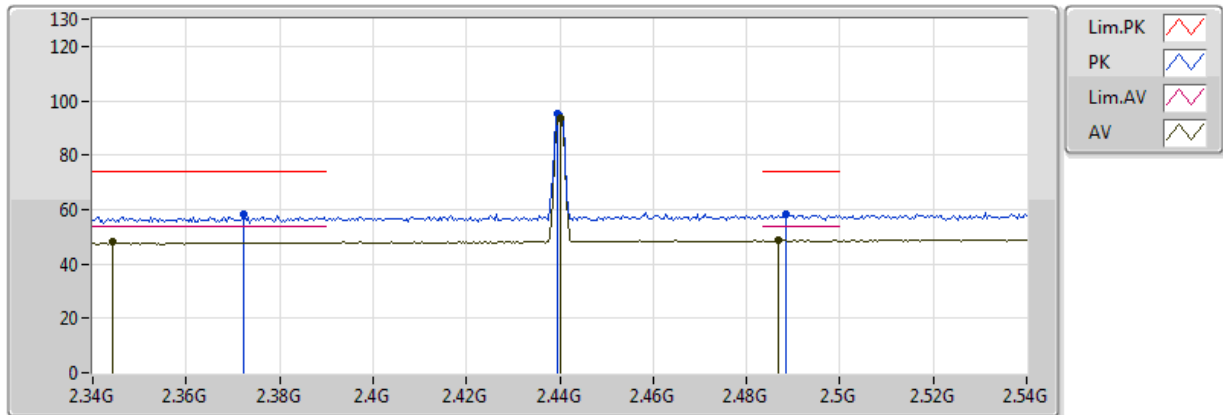


EUT : Z axis ANT : Z axis

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	2.3796G	47.61	54.00	-6.39	31.13	3	V	28	2.82	-
AV	2.44G	99.99	Inf	-Inf	31.36	3	V	28	2.82	-
AV	2.498G	48.31	54.00	-5.69	31.58	3	V	28	2.82	-
PK	2.3572G	57.79	74.00	-16.21	31.04	3	V	28	2.82	-
PK	2.4396G	101.68	Inf	-Inf	31.36	3	V	28	2.82	-
PK	2.4968G	58.99	74.00	-15.01	31.58	3	V	28	2.82	-

BT-LE(1Mbps)

2440MHz_TX

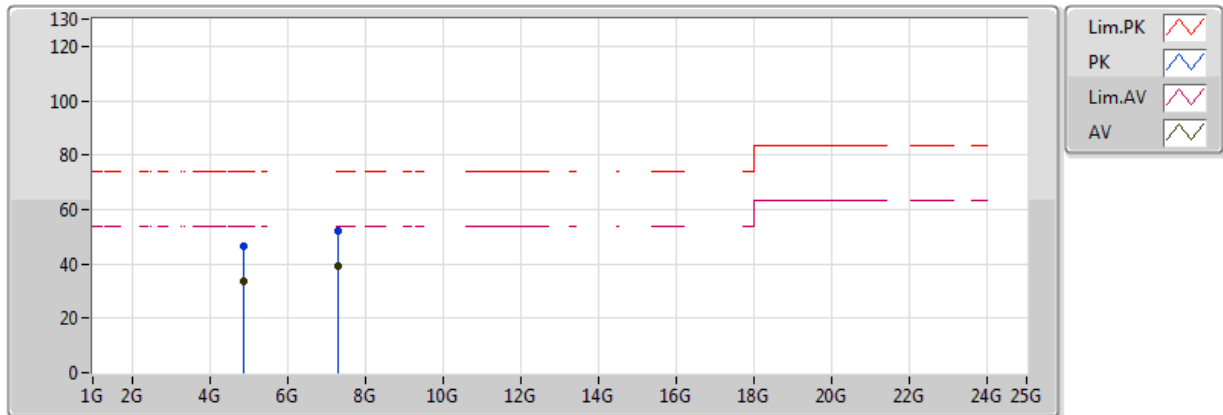


EUT : Z axis ANT : Z axis

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	2.3444G	47.98	54.00	-6.02	30.99	3	H	123	3.35	-
AV	2.44G	93.30	Inf	-Inf	31.36	3	H	123	3.35	-
AV	2.4868G	48.63	54.00	-5.37	31.54	3	H	123	3.35	-
PK	2.3724G	58.53	74.00	-15.47	31.10	3	H	123	3.35	-
PK	2.4396G	95.04	Inf	-Inf	31.36	3	H	123	3.35	-
PK	2.4884G	58.52	74.00	-15.48	31.55	3	H	123	3.35	-

BT-LE(1Mbps)

2440MHz_TX

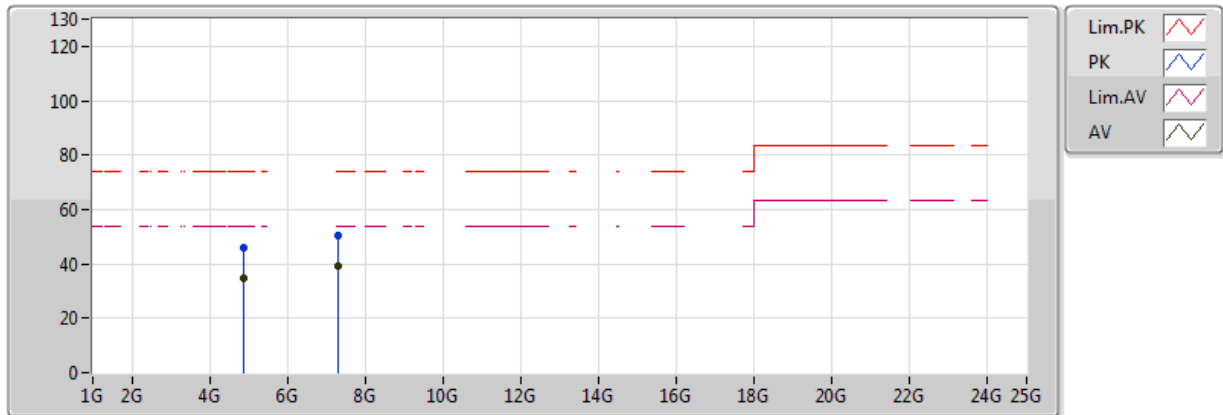


EUT : Z axis ANT : Z axis

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	4.88G	33.38	54.00	-20.62	2.56	3	V	360	1.50	-
AV	7.32G	39.06	54.00	-14.94	8.43	3	V	0	1.50	-
PK	4.88G	46.24	74.00	-27.76	2.56	3	V	360	1.50	-
PK	7.32G	51.87	74.00	-22.13	8.43	3	V	0	1.50	-

BT-LE(1Mbps)

2440MHz_TX

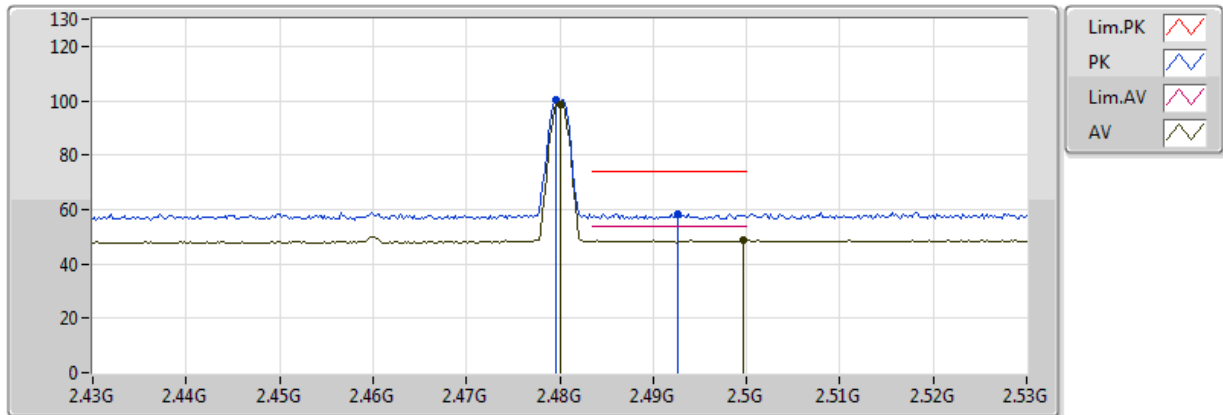


EUT : Z axis ANT : Z axis

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	4.88G	34.73	54.00	-19.27	2.56	3	H	360	1.50	-
AV	7.32G	38.98	54.00	-15.02	8.43	3	H	0	1.50	-
PK	4.88G	45.90	74.00	-28.10	2.56	3	H	360	1.50	-
PK	7.32G	50.67	74.00	-23.33	8.43	3	H	0	1.50	-

BT-LE(1Mbps)

2480MHz_TX

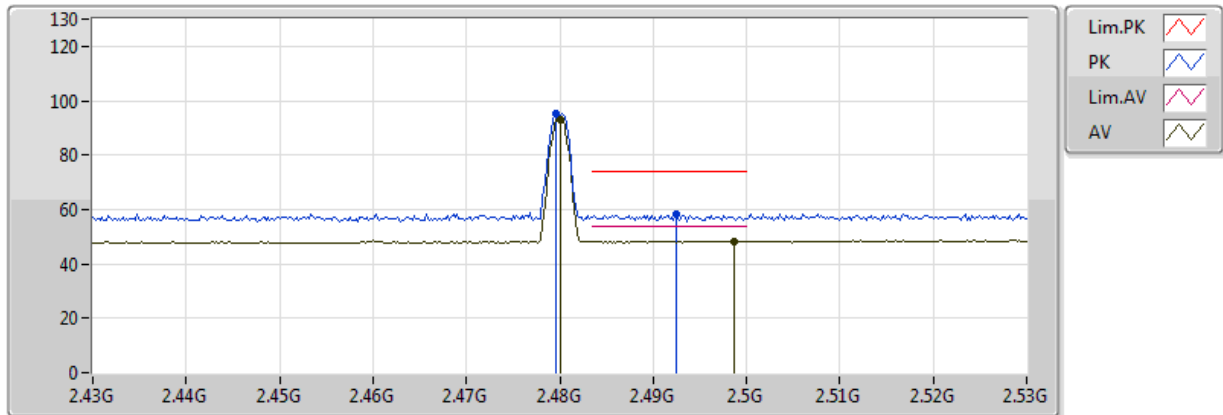


EUT : Z axis ANT : Z axis

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	98.71	Inf	-Inf	31.51	3	V	15	3.04	-
AV	2.4996G	48.71	54.00	-5.29	31.59	3	V	15	3.04	-
PK	2.4796G	100.44	Inf	-Inf	31.51	3	V	15	3.04	-
PK	2.4926G	58.30	74.00	-15.70	31.56	3	V	15	3.04	-

BT-LE(1Mbps)

2480MHz_TX

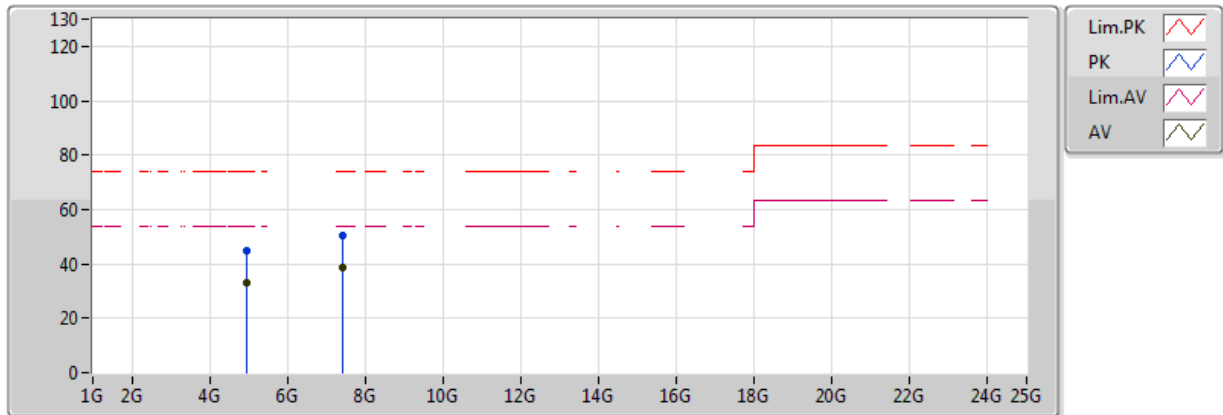


EUT : Z axis ANT : Z axis

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	93.27	Inf	-Inf	31.51	3	H	28	3.61	-
AV	2.4986G	48.46	54.00	-5.54	31.58	3	H	28	3.61	-
PK	2.4796G	95.06	Inf	-Inf	31.51	3	H	28	3.61	-
PK	2.4924G	58.18	74.00	-15.82	31.56	3	H	28	3.61	-

BT-LE(1Mbps)

2480MHz_TX

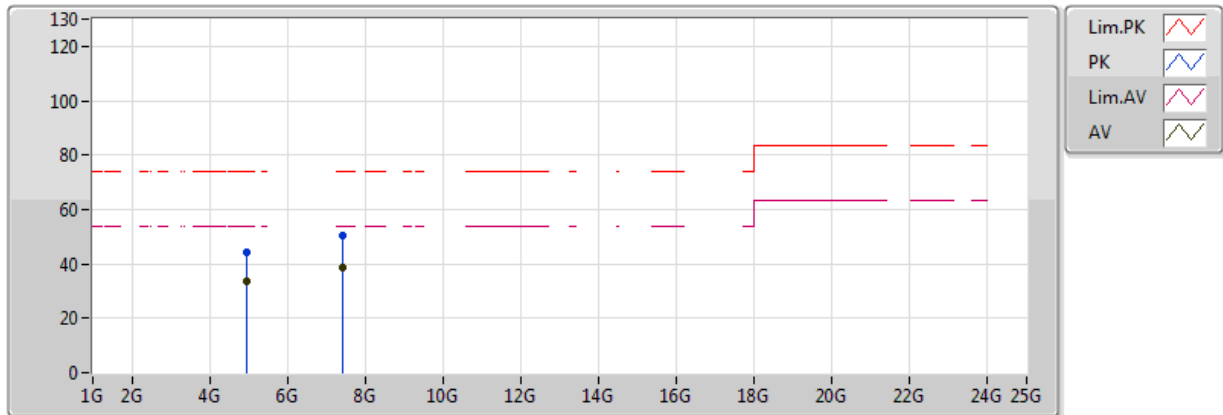


EUT : Z axis ANT : Z axis

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	4.96G	33.05	54.00	-20.95	2.68	3	V	360	1.50	-
AV	7.44G	38.70	54.00	-15.30	8.59	3	V	0	1.50	-
PK	4.96G	44.93	74.00	-29.07	2.68	3	V	360	1.50	-
PK	7.44G	50.16	74.00	-23.84	8.59	3	V	0	1.50	-

BT-LE(1Mbps)

2480MHz_TX

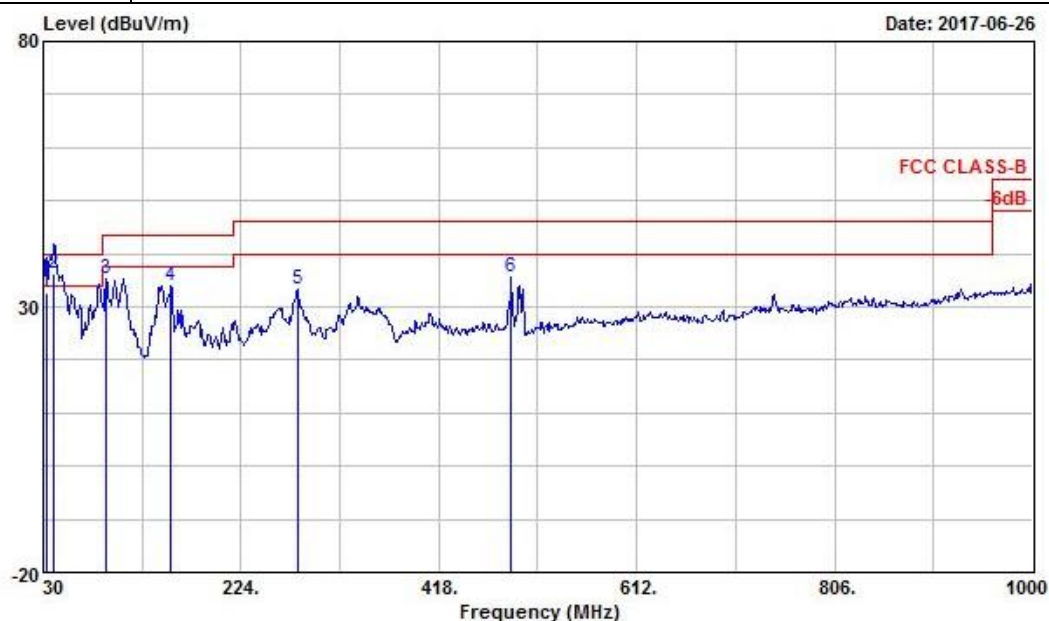


EUT : Z axis ANT : Z axis

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	4.96G	33.61	54.00	-20.39	2.68	3	H	0	1.50	-
AV	7.44G	38.67	54.00	-15.33	8.59	3	H	360	1.50	-
PK	4.96G	44.53	74.00	-29.47	2.68	3	H	0	1.50	-
PK	7.44G	50.68	74.00	-23.32	8.59	3	H	360	1.50	-

Radiated Emission Co-Location (Below 1GHz)

Operating Mode	3	Polarization	V
Operating Function	(Z Plane) FAP-U321EV + WiFi 2.4G+5G+BT , USB R/W + LAN 1Gbps (LAN2) + PoE Adapter(LAN1)		

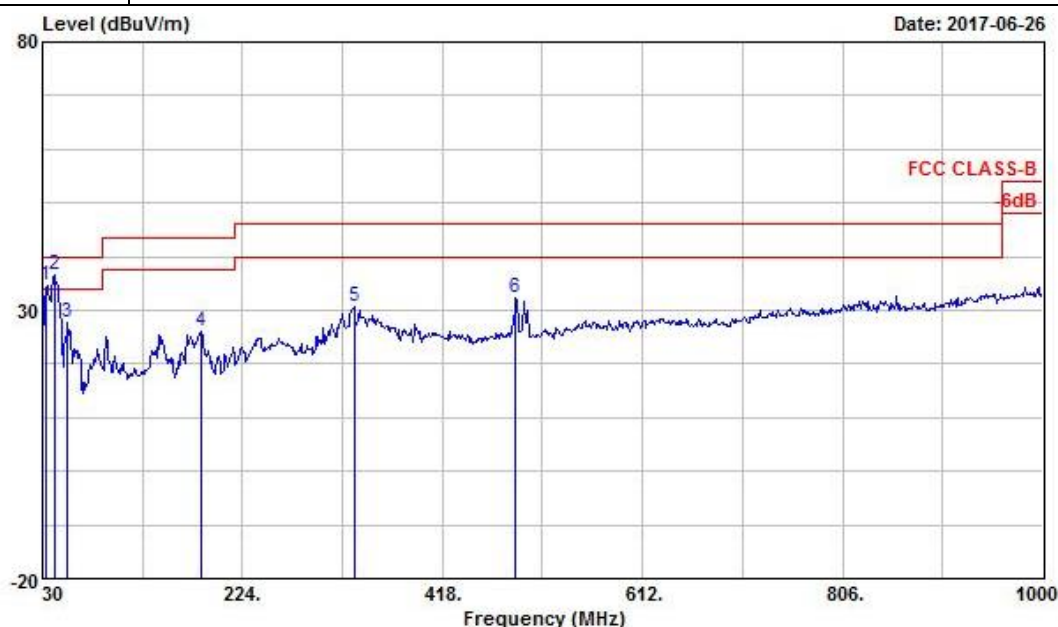


	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Preamp Factor	Cable Loss	Ant Pos	Table Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	cm	deg	
1	32.700	32.48	-7.52	40.00	39.11	23.13	30.31	0.56	100	162 QP
2 @	40.530	36.35	-3.65	40.00	47.00	19.07	30.31	0.59	100	0 QP
3	92.100	35.18	-8.32	43.50	49.53	15.08	30.23	0.80	---	Peak
4	154.740	33.92	-9.58	43.50	46.12	16.79	30.01	1.02	---	Peak
5	278.940	33.36	-12.64	46.00	42.78	18.78	29.56	1.37	---	Peak
6	489.000	35.49	-10.51	46.00	40.26	23.90	30.48	1.82	---	Peak

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)
 Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

Radiated Emission Co-Location (Below 1GHz)

Operating Mode	3	Polarization	H
Operating Function	(Z Plane) FAP-U321EV + WiFi 2.4G+5G+BT , USB R/W + LAN 1Gbps (LAN2) + PoE Adapter(LAN1)		



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Preamp Factor	Cable Loss	Ant Pos	Table Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1 !	34.050	34.66	-5.34	40.00	41.80	22.62	30.31	0.56	---	---	Peak
2 @	41.340	36.61	-3.39	40.00	47.79	18.54	30.31	0.59	100	120	Peak
3	53.490	27.84	-12.16	40.00	44.29	13.20	30.30	0.65	---	---	Peak
4	184.170	26.10	-17.40	43.50	40.04	14.86	29.91	1.11	---	---	Peak
5	332.200	30.52	-15.48	46.00	38.80	19.89	29.67	1.49	---	---	Peak
6	489.000	32.34	-13.66	46.00	37.11	23.90	30.48	1.82	---	---	Peak

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)
 Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

