NCC Test Report

Equipment	:	**Embedded System Module – WLAN/BT – Jetson TX1**
Brand Name	:	**NVIDIA**
Model Name	:	**P2180**
Applicant	:	**CISCO SYSTEMS, INC. 170 West Tasman Dr. San Jose, CA 95134, USA**
Manufacturer	:	**CISCO SYSTEMS, INC. 170 West Tasman Dr. San Jose, CA 95134, USA**
Standard	:	**LP0002 Section 3.10 (2018-01-10)**

The product was received on Feb. 27, 2018, and testing was started from Mar. 08, 2018 and completed on Mar. 17, 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

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PHOTOGRAPHS OF EUT V01

History of this test report

Report No.	Version	Description	Issued Date
TR822707-01AL	01	Initial issue of report	Aug. 02, 2018

Summary of Test Result

Report Clause	Ref. Std. Clause	Test Items	Result (PASS/FAIL)	Remark
1.1.2	3.10.1.4	Antenna Requirement	PASS	LP0002-2.2
3.1	2.3	AC Power-line Conducted Emissions	PASS	LP0002-2.3
3.2	3.10.1.6	DTS Bandwidth	PASS	≥500kHz
3.3	3.10.1.2	Maximum Conducted Output Power	PASS	Power [dBm]:30
3.4	3.10.1.6	Power Spectral Density	PASS	PSD [dBm/3kHz]:8
3.5	3.10.1.5	Emissions in Non-restricted Frequency Bands	PASS	Non-Restricted Bands: >30 dBc
3.6	3.10.1.5	Emissions in Restricted Frequency Bands	PASS	Restricted Bands: LP0002-2.8
3.7	2.11	Receiver Radiated Unwanted Emissions	PASS	Restricted Bands: LP0002-2.8

Reviewed by: Jeremy Lin

Report Producer: Debby Hung

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	Shanghai Amphenol Airwave	Ci8717-15-000-R	PCB Antenna	Reversed-SMA
2	2	Shanghai Amphenol Airwave	Ci8717-15-000-R	PCB Antenna	Reversed-SMA
3	-	Shanghai Amphenol Airwave	Ci8210-15-000-R-TA	PCB Antenna	I-PEX
4	-	Shanghai Amphenol Airwave	Ci8211-15-000-R	PCB Antenna	I-PEX
5	-	Shanghai Amphenol Airwave	CI9808-15-000-R	PCB Antenna	I-PEX
6	-	Shanghai Amphenol Airwave	CI9809-15-000-R	PCB Antenna	I-PEX
7	-	Shanghai Amphenol Airwave	CI9811-15-000-R	PCB Antenna	I-PEX
8	-	Shanghai Amphenol Airwave	CI9810-15-000-R	PCB Antenna	I-PEX
9	-	Shanghai Amphenol Airwave	CI9812-15-000-R	PCB Antenna	I-PEX
10	-	Shanghai Amphenol Airwave	CI9813-15-000-R	PCB Antenna	I-PEX

Ant.	Gain (dBi)					
	2.4G	BT	U-NII-1	U-NII-2A	U-NII-2C	U-NII-3
1	6.02	6.02	5.53	6.48	7.91	5.38
2	6.02	6.02	5.53	6.48	7.91	5.38
3	-2.3	-2.3	2.5	2.9	3	3.2
4	-2.1	-2.1	1.2	1.7	3.2	4.1
5	-	-	-7.8	-7.8	-6.5	-5
6	-	-	-5.9	-5.7	-4.5	-3.1
7	-	-	-6.5	-6.1	-4.1	-3.7
8	-	-	-6.1	-5.7	-4.6	-3.3
9	-	-	-6.1	-7.6	-4.8	-4
10	-	-	-6.1	-7.6	-4.8	-4

Note : EUT can match with above antennas for using. Higher gain antenna(Ant.1 and Ant. 2) was used to perform the worst configuration and result of that was recorded as the final test result.

For 2.4GHz function:

For IEEE 802.11 b/g mode (1TX/1RX)

Support diversity function and pre-tested on each single chain, the worst case was Ant. 1(port 1) and it was record in this test report.

For IEEE 802.11 n mode (2TX/2RX)

Supports 2T2R Spatial Multiplexing MIMO configuration.

For BT function:

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

For 5GHz function:

For IEEE 802.11 a mode (1TX/1RX)

Support diversity function and pre-tested on each single chain, the worst case was Ant. 1(port 1) and it was record in this test report.

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

Supports 2T2R Spatial Multiplexing MIMO configuration.

1.1.3 EUT Information

Operational Condition			
EUT Power Type	From AC Adapter		
RF Chip	BCM4354		
Type of EUT			
☒	Stand-alone		
☐	Combined (EUT where the radio part is fully integrated within another device)		
	Combined Equipment - Brand Name / Model No.:	…	
☐	Plug-in radio (EUT intended for a variety of host systems)		
	Host System - Brand Name / Model No.:	…	
☐	Other:		

1.1.4 Mode Test Duty Cycle

Mode	DC	DCF(dB)	T(s)	VBW(Hz) ≥ 1/T
BT-LE(1Mbps)	0.625	2.041	391.25u	3k

1.1.5 Table for Permissive Change

This product is an extension of original one reported under Sporton project number: TR822707AL

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

Modifications	Performance Checking
Six Antenna were added	N/A

1.2 Testing Applied Standards

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

- LP0002 (2018-01-10)
- ANSI C63.10-2013
- KDB 558074 D01 v04
- ANSI C63.4-2014

1.3 Testing Location Information

Testing Location							
☒	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
☐	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 Condition	Test Site No.	Test Engineer	Test Environment	Test Date
RF Conducted	TH06-HY	Barry	24.5°C / 62%	12/Mar/2018
Radiated	03CH02-HY	Jerry	25.8°C / 55%	08/Mar/2018
AC Conduction	CO04-HY	Daniel	22.8°C / 51%	17/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

RF Conducted	Abbreviation	Remark
RF Conducted-DTS	Abbreviation	Remark
TnomVnom	Tnom	20°C
-	Vnom	110V

2.2 Test Channel Mode

Test Software	DoS

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	CTX/CRX
1	Adapter mode ; BT4.0 TX
2	Adapter mode ; BT4.0 RX

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 Receiver Radiated Unwanted Emissions
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/CRX
1	Adapter mode ; BT4.0 TX
2	Adapter mode ; BT4.0 RX
Operating Mode > 1GHz	CTX/CRX
Orthogonal Planes of EUT	**Z Plane**

2.4 Support Equipment

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

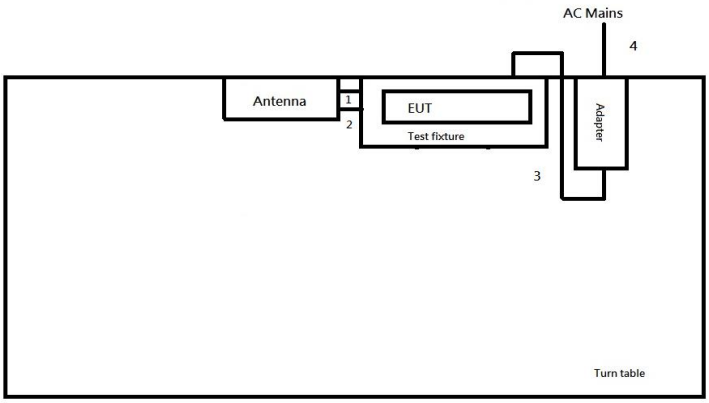
Note: Support equipment No.4 was provided by customer.

Support Equipment – Radiated Emission and AC Conduction				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
1	Fixture	-	-	-
2	AC Adapter	AcBel	ADF019	-

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

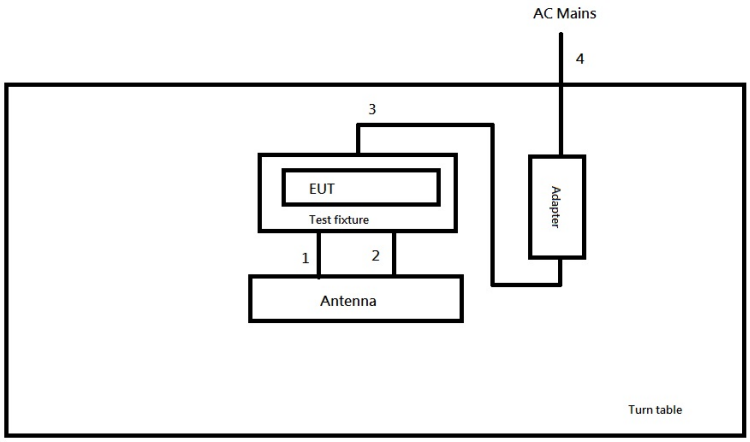
2.5 Test Setup Diagram

Test Setup Diagram – AC Line Conducted Emission Test (TX&RX)



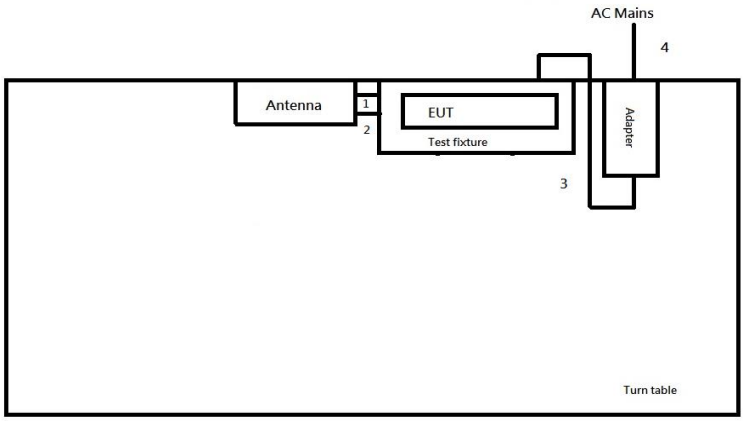
Item	Connection	Shielded	Length(m)	Remark
1	Antenna cable	No	0.75	-
2	Antenna cable	No	0.75	-
3	DC Power line	No	1.4	-
4	AC Power line	No	1.0	-

Test Setup Diagram - Radiated Test (TX)



Item	Connection	Shielded	Length(m)	Remark
1	Antenna cable	No	0.75	-
2	Antenna cable	No	0.75	-
3	DC Power line	No	1.4	-
4	AC Power line	No	1.0	-

Test Setup Diagram - Radiated Test (RX)



Item	Connection	Shielded	Length(m)	Remark
1	Antenna cable	No	0.75	-
2	Antenna cable	No	0.75	-
3	DC Power line	No	1.4	-
4	AC Power line	No	1.0	-

3 Transmitter Test Result

3.1 AC Power-line Conducted Emissions

3.1.1 AC Power-line Conducted Emissions Limit

AC Power-line Conducted Emissions Limit		
Frequency Emission (MHz)	**Quasi-Peak**	**Average**
0.15-0.5	66 - 56 *	56 - 46 *
0.5-5	56	46
5-30	60	50
Note 1: * Decreases with the logarithm of the frequency.		

3.1.2 Measuring Instruments

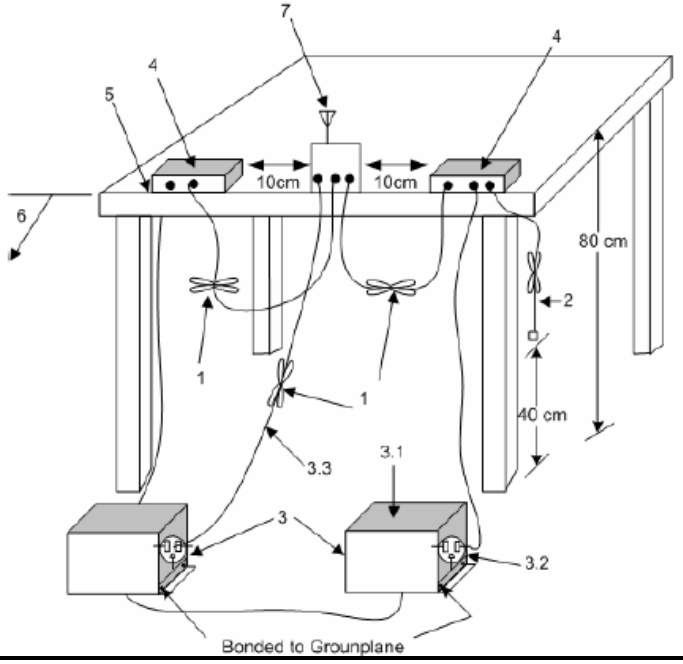
Refer a test equipment and calibration data table in this test report.

3.1.3 Test Procedures

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

3.1.4 Test Setup

AC Power-line Conducted Emissions



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 ≥ 500 kHz.

3.2.2 Measuring Instruments

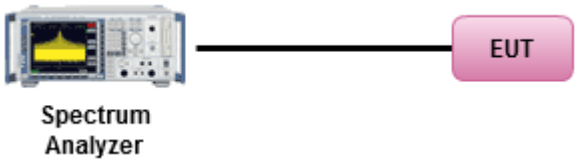
Refer a test equipment and calibration data table in this test report.

3.2.3 Test Procedures

Test Method	
▪ For the emission bandwidth shall be measured using one of the options below:	
	☒ Refer as KDB 558074, clause 8.1 Option 1 for 6 dB bandwidth measurement.
	☐ Refer as KDB 558074, clause 8.2 Option 2 for 6 dB bandwidth measurement.
	☐ Refer as ANSI C63.10, clause 6.9.3 for occupied bandwidth testing.
	☐ Refer as RSS-Gen, clause 6.7 for occupied bandwidth testing.

3.2.4 Test Setup

Emission Bandwidth



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): $P_{eirp} \leq MAX(36, [P_{Out} + G_{TX}])$ dBm	
	▪ Smart antenna system (SAS)	
		- Single beam: $P_{eirp} \leq MAX(36, P_{Out} + G_{TX})$ dBm
		- Overlap beam: $P_{eirp} \leq MAX(36, P_{Out} + G_{TX})$ dBm
		- Aggregate power on all beams: $P_{eirp} \leq MAX(36, [P_{Out} + G_{TX} + 8])$ 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	
▪ Maximum Peak Conducted Output Power	
	☐ Refer as KDB 558074, clause 9.1.1 Option 1 (RBW ≥ EBW method).
	☐ Refer as KDB 558074, clause 9.1.2 Option 2 (integrated band power method)
	☐ Refer as KDB 558074, clause 9.1.3 Option 3 (peak power meter for VBW ≥ DTS BW)
▪ Maximum Average Conducted Output Power	
	Duty cycle ≥ 98%
	☐ Refer as KDB 558074, clause 9.2.2.4 Method AVGSA-2 (spectral trace averaging).
	Duty cycle < 98%
	☐ 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
	☒ Refer as KDB 558074, clause 9.2.3.1 Method AVGPM (using an RF average power meter).
▪ For conducted measurement.	
	▪ 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.
	▪ If multiple transmit chains, EIRP calculation could be following as methods: $P_{total} = P_1 + P_2 + \ldots + P_n$ (calculated in linear unit [mW] and transfer to log unit [dBm]) $EIRP_{total} = P_{total} + DG$

3.3.4 Test Setup

Maximum Conducted Output Power (Power Meter)

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

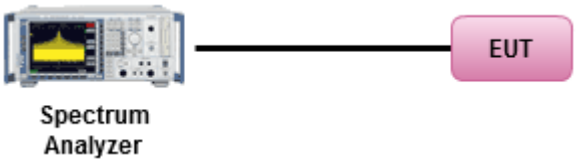
3.4.2 Measuring Instruments

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).		
	☒ 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:	
		▪ 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

Power Spectral Density


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

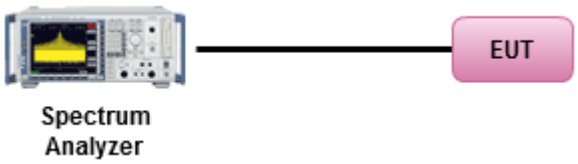
Refer a test equipment and calibration data table in this test report.

3.5.3 Test Procedures

Test Method
▪ Refer as KDB 558074, clause 11 for unwanted emissions into non-restricted bands.

3.5.4 Test Setup

Emissions in Non-restricted Frequency Bands



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 below30 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.

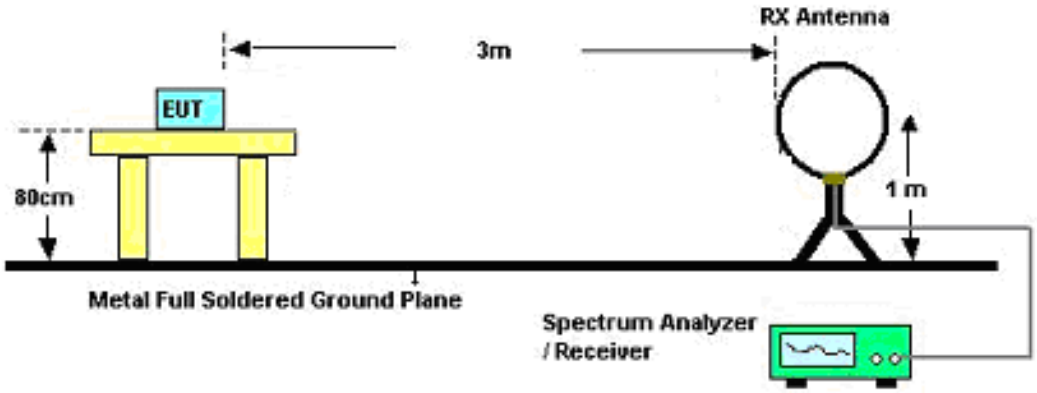
3.6.3 Test Procedures

Test Method		
▪ The average emission levels shall be measured in [duty cycle ≥ 98 or duty factor].		
▪ Refer as ANSI C63.10, clause 6.10.3 band-edge testing shall be performed at the lowest frequency channel and highest frequency channel within the allowed operating band.		
▪ For the transmitter unwanted emissions shall be measured using following options below:		
	▪ Refer as KDB 558074, clause 12 for unwanted emissions into restricted bands.	
		☒ Refer as KDB 558074, clause 12.2.5.3 (ANSI C63.10, clause 4.1.4.2.3), Reduced VBW≥1/T.
		☒ Refer as KDB 558074, clause 12.2.4 measurement procedure peak limit.
▪ For the transmitter band-edge emissions shall be measured using following options below:		
	▪ 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.	
	▪ Refer as KDB 558074, clause 13.2 (ANSI C63.10, clause 6.10.6) for marker-delta method for band-edge measurements.	
	▪ 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).	
▪ For conducted and cabinet radiation measurement, refer as KDB 558074, clause 12.2.2.		
	▪ 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	
	▪ 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.	

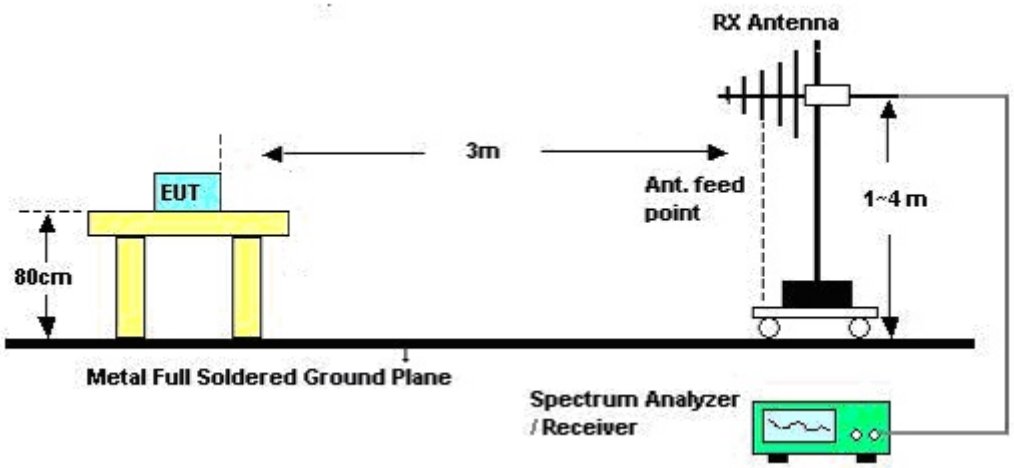
3.6.4 Test Setup

Emissions in Restricted Frequency Bands

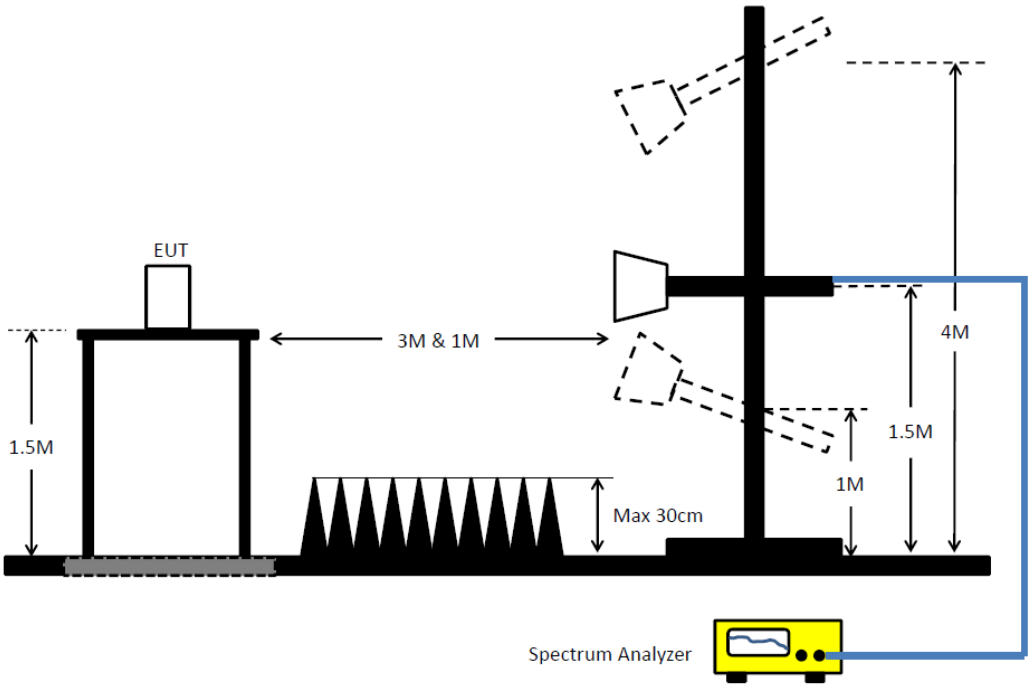
9kHz ~30MHz



30MHz~1GHz



Above 1GHz



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

3.7 Receiver Radiated Spurious Emissions

3.7.1 Receiver in Radiated Spurious Emissions Limit

Restricted Spurious 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.

3.7.2 Measuring Instruments

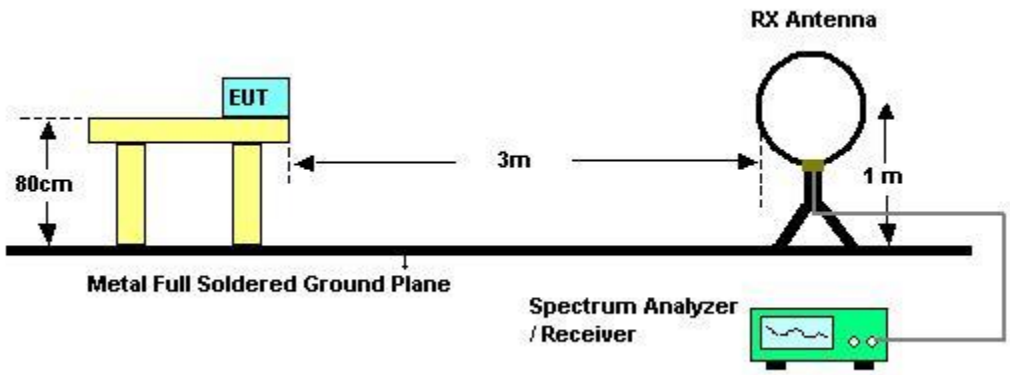
Refer a test equipment and calibration data table in this test report.

3.7.3 Test Procedures

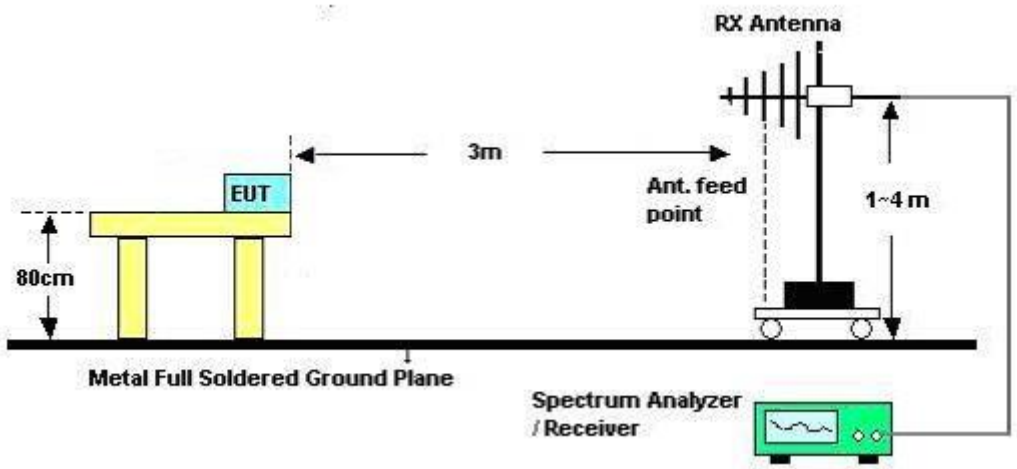
Test Method		
☒	The search for spurious emissions shall be from the lowest frequency internally generated or used in the receiver (e.g. local oscillator, intermediate or carrier frequency), or 30 MHz, whichever is higher, to at least 3 times the highest tuneable or local oscillator frequency, whichever is higher, without exceeding 40 GHz.	
☒	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).	
☒	For radiated measurement, refer as KDB558074, clause 12.2.7.	
	☒	Refer as ANSI C63.4, clause 8.3.1.1 and 8.3.2.1 for radiated emissions from below 30 MHz.
	☒	Refer as ANSI C63.4, clause 8.3.1.1 and 8.3.2.1 for radiated emissions from 30 MHz-1 GHz. For the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the QP-Limit so that the QP level does not need to be reported in addition.
	☒	Refer as ANSI C63.4, clause 8.3.1.2 and 8.3.2.2 for radiated emissions from above 1 GHz. For the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.
☒	All amplitude of spurious emissions that are attenuated by more than 30 dB below the permissible value has no need to be reported.	

3.7.4 Test Setup

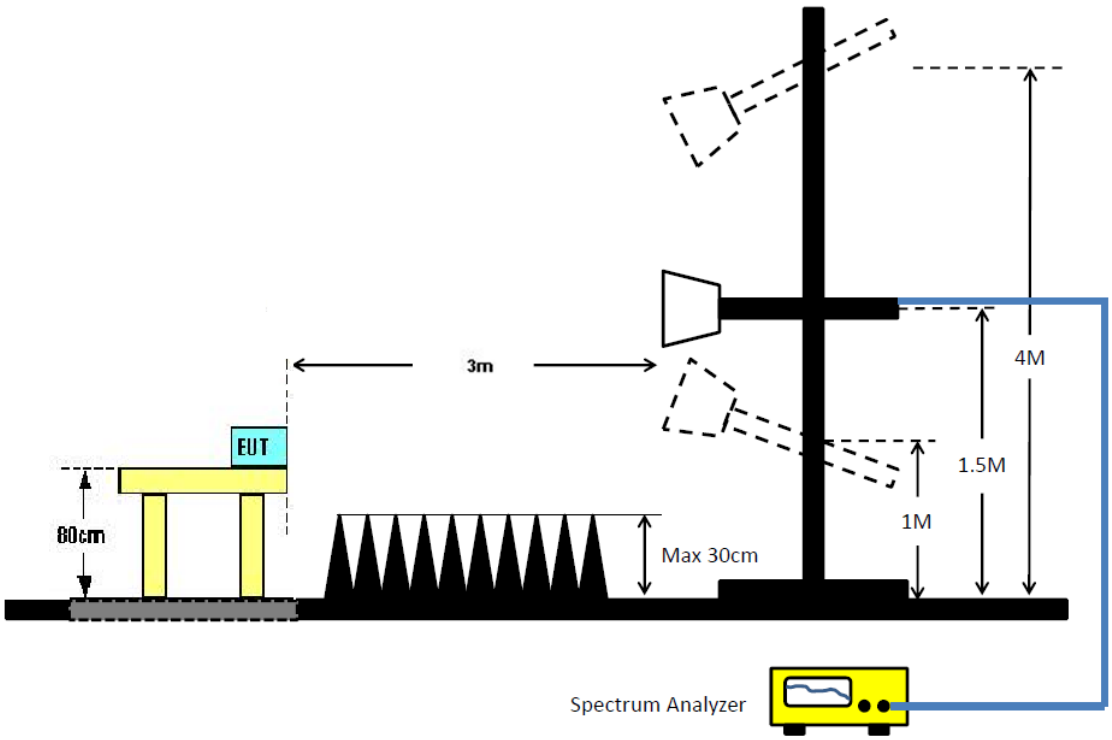
Receiver Spurious and Out of Band Emissions (9 kHz - 30 MHz)



Receiver Radiated Unwanted Emissions (below 1GHz)



Receiver Radiated Unwanted Emissions (above 1GHz)



3.7.5 Receiver Radiated Unwanted Emissions (Below 30MHz)

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

3.7.6 Test Result of Receiver Radiated Unwanted Emissions

Refer as Appendix G

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

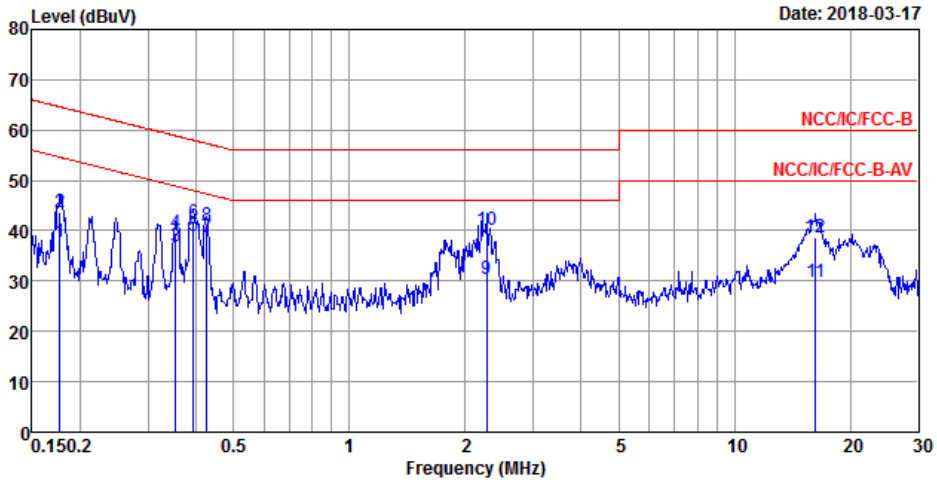
Instrument for Radiated Test

Instrument	Manufacturer	Model No.	Serial No.	Spec.	Calibration Date	Calibration Due Date
Spectrum Analyzer	R&S	FSP40	100305	9KHz - 40GHz	12/Dec/2017	11/Dec/2018
3m Semi Anechoic	SIDT FRANKONIA	SAC-3M	03CH02-HY	30MHz-1GHz	20/Oct/2017	19/Oct/2018
3m Semi Anechoic	SIDT FRANKONIA	SAC-3M	03CH02-HY	1GHz ~ 18GHz	27/Oct/2017	26/Oct/2018
Amplifier	Agilent	8447D	2944A11149	100KHz-1.3GHz	29/Jun/2017	28/Jun/2018
Amplifier	Ketsight	8449B	3008A02602	1GHz-26.5GHz	19/Sep/2017	18/Sep/2018
Horn Antenna	SCHWARZBECK	BBHA9120D	BBHA9120D 01531	1GHz-18GHz	11/May/2017	10/May/2018
Horn Antenna	SCHWARZBECK	BBHA9170	BBHA9170154	18GHz-40GHz	06/Feb/2018	05/Feb/2019
Bilog Antenna	SCHAFFNER	CBL6112B	2723	30MHz-1GHz	09/Sep/2017	08/Sep/2018
Amplifier	MITEQ	TTA1840-35-HG	1864481	18GHz-40GHz	31/Aug/2017	30/Aug/2018
RF Cable-high	SUHNER	SUCOFLEX104	MY34918/4	1GHz ~ 40GHz	19/Jan/2018	18/Jan/2019
RF Cable-R03m	Jye Bao	RG142	CB017	9kHz ~ 1GHz	19/Jan/2018	18/Jan/2019
Receiver	R&S	ESU3	102052	9kHz ~ 3.6GHz	29/Apr/2017	28/Apr/2018

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	29/Dec/2017	28/Dec/2018
Power Sensor	Anritsu	MA2411B	1027452	300MHz ~ 40GHz	27/Feb/2018	26/Feb/2019
Power Meter	Anritsu	ML2495A	1124009	300MHz ~ 40GHz	27/Feb/2018	26/Feb/2019
Signal Generator	R&S	SMR40	100116	10MHz ~ 40GHz	27/Jul/2017	26/Jul/2018
Temp. and Humidity Chamber	Giant Force	GTH-225-40-CP-AR	MAA1611-005	-40 ~ 100℃	21/Nov/2016	20/Nov/2018
RF Cable-0.2m	HUBER+SUHNER	SUCOFLEX_104	MY677/3	30MHz ~ 26.5GHz	25/Aug/2017	24/Aug/2018
RF Cable-0.2m	HUBER+SUHNER	SUCOFLEX_104	MY678/3	30MHz ~ 26.5GHz	25/Aug/2017	24/Aug/2018
RF Cable-0.5m	HUBER+SUHNER	SUCOFLEX_104	MY10717/4	30MHz ~ 26.5GHz	25/Aug/2017	24/Aug/2018
RF Cable-1.5m	HUBER+SUHNER	SUCOFLEX_104	MY12586/4	30MHz ~ 26.5GHz	25/Aug/2017	24/Aug/2018

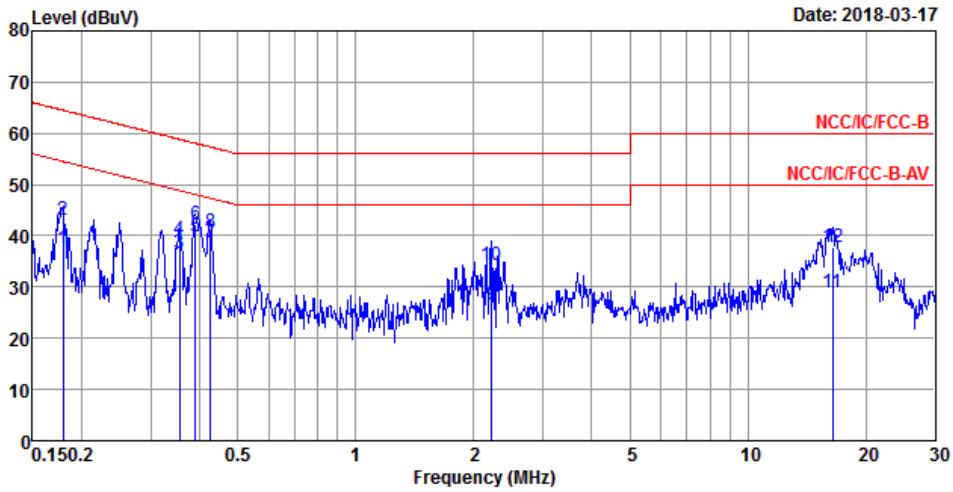
AC Power-line Conducted Emissions Result			
Operating Mode	1	**Power Phase**	Neutral
Operating Function	Adapter Mode ; BT4.0 TX		



		Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
		MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1		0.1768	37.85	-16.79	54.64	28.21	9.62	0.02	Average
2		0.1768	43.68	-20.96	64.64	34.04	9.62	0.02	QP
3		0.3539	37.02	-11.85	48.87	27.33	9.61	0.08	Average
4		0.3539	39.55	-19.32	58.87	29.86	9.61	0.08	QP
5		0.3934	38.93	-9.06	47.99	29.22	9.61	0.10	Average
6		0.3934	41.63	-16.36	57.99	31.92	9.61	0.10	QP
7	MAX	0.4260	38.62	-8.71	47.33	28.92	9.61	0.09	Average
8		0.4260	40.99	-16.34	57.33	31.29	9.61	0.09	QP
9		2.2726	30.28	-15.72	46.00	20.63	9.63	0.02	Average
10		2.2726	40.13	-15.87	56.00	30.48	9.63	0.02	QP
11		16.2256	29.77	-20.23	50.00	20.02	9.70	0.05	Average
12		16.2256	38.55	-21.45	60.00	28.80	9.70	0.05	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.)

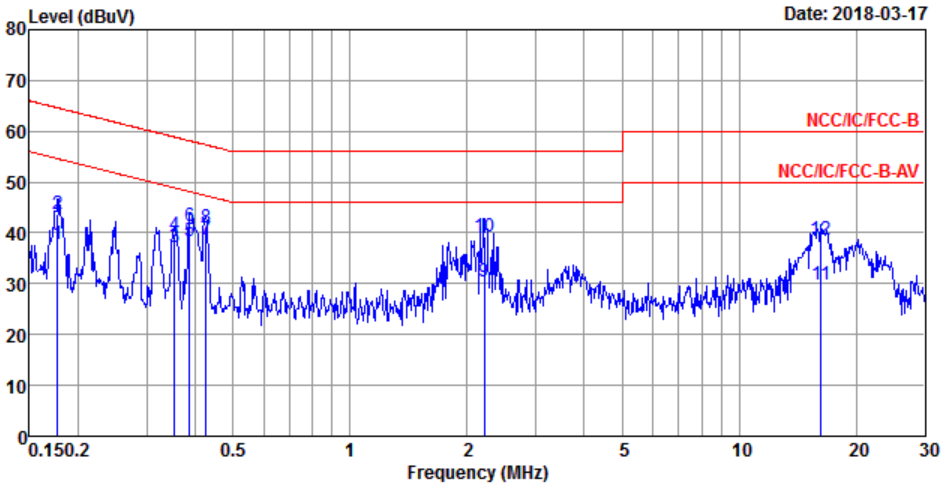
AC Power-line Conducted Emissions Result			
Operating Mode	1	**Power Phase**	Line
Operating Function	Adapter Mode ; BT4.0 TX		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.1796	37.48	-17.02	54.50	27.84	9.62	0.02	Average
2	0.1796	43.22	-21.28	64.50	33.58	9.62	0.02	QP
3	0.3558	36.72	-12.11	48.83	27.03	9.61	0.08	Average
4	0.3558	39.37	-19.46	58.83	29.68	9.61	0.08	QP
5 MAX	0.3893	39.83	-8.25	48.08	30.12	9.61	0.10	Average
6	0.3893	42.12	-15.96	58.08	32.41	9.61	0.10	QP
7	0.4260	38.54	-8.79	47.33	28.84	9.61	0.09	Average
8	0.4260	40.83	-16.50	57.33	31.13	9.61	0.09	QP
9	2.2249	26.58	-19.42	46.00	16.95	9.62	0.01	Average
10	2.2249	34.12	-21.88	56.00	24.49	9.62	0.01	QP
11	16.4856	28.95	-21.05	50.00	19.25	9.63	0.07	Average
12	16.4856	37.80	-22.20	60.00	28.10	9.63	0.07	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.)

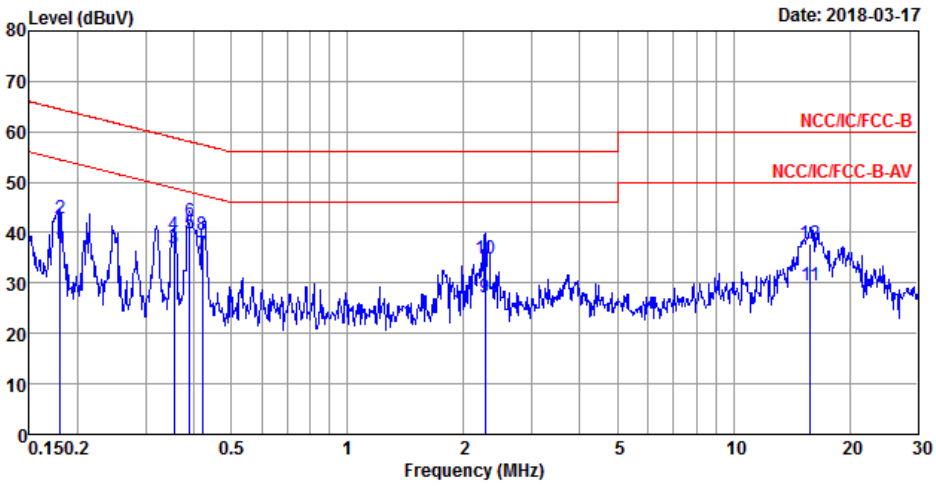
AC Power-line Conducted Emissions Result			
Operating Mode	2	**Power Phase**	Neutral
Operating Function	Adapter Mode ; BT4.0 RX		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.1768	37.85	-16.79	54.64	28.21	9.62	0.02	Average
2	0.1768	43.72	-20.92	64.64	34.08	9.62	0.02	QP
3	0.3539	37.07	-11.80	48.87	27.38	9.61	0.08	Average
4	0.3539	39.45	-19.42	58.87	29.76	9.61	0.08	QP
5	0.3872	38.29	-9.83	48.12	28.58	9.61	0.10	Average
6	0.3872	41.23	-16.89	58.12	31.52	9.61	0.10	QP
7 MAX	0.4260	38.62	-8.71	47.33	28.92	9.61	0.09	Average
8	0.4260	40.99	-16.34	57.33	31.29	9.61	0.09	QP
9	2.2132	30.31	-15.69	46.00	20.67	9.63	0.01	Average
10	2.2132	39.37	-16.63	56.00	29.73	9.63	0.01	QP
11	16.2256	29.88	-20.12	50.00	20.13	9.70	0.05	Average
12	16.2256	38.61	-21.39	60.00	28.86	9.70	0.05	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	2	**Power Phase**	Line
Operating Function	Adapter Mode ; BT4.0 RX		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.1806	36.75	-17.71	54.46	27.12	9.62	0.01	Average
2	0.1806	42.70	-21.76	64.46	33.07	9.62	0.01	QP
3	0.3558	36.82	-12.01	48.83	27.13	9.61	0.08	Average
4	0.3558	39.52	-19.31	58.83	29.83	9.61	0.08	QP
5 MAX	0.3893	39.97	-8.11	48.08	30.26	9.61	0.10	Average
6	0.3893	42.10	-15.98	58.08	32.39	9.61	0.10	QP
7	0.4215	35.64	-11.78	47.42	25.94	9.61	0.09	Average
8	0.4215	39.64	-17.78	57.42	29.94	9.61	0.09	QP
9	2.2726	27.21	-18.79	46.00	17.57	9.62	0.02	Average
10	2.2726	34.71	-21.29	56.00	25.07	9.62	0.02	QP
11	15.8014	29.52	-20.48	50.00	19.85	9.63	0.04	Average
12	15.8014	37.74	-22.26	60.00	28.07	9.63	0.04	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)
2.4-2.4835GHz	-	-	-	-	-
BT-LE(1Mbps)	715k	1.056M	1M06F1D	707.5k	1.054M

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

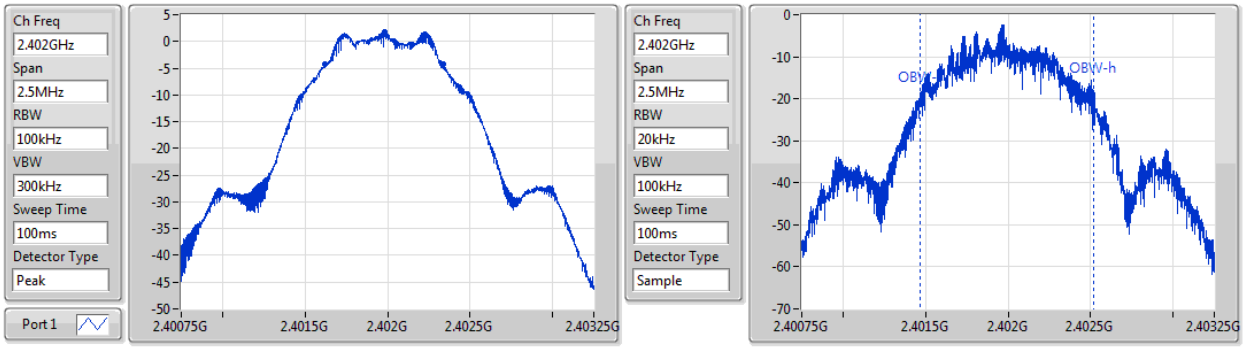
Mode	Result	Limit (Hz)	Port 1-N dB (Hz)	Port 1-OBW (Hz)
BT-LE(1Mbps)	-	-	-	-
2402MHz_TnomVnom	Pass	500k	715k	1.054M
2440MHz_TnomVnom	Pass	500k	711.25k	1.056M
2480MHz_TnomVnom	Pass	500k	707.5k	1.054M

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

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

2402MHz

12/03/2018

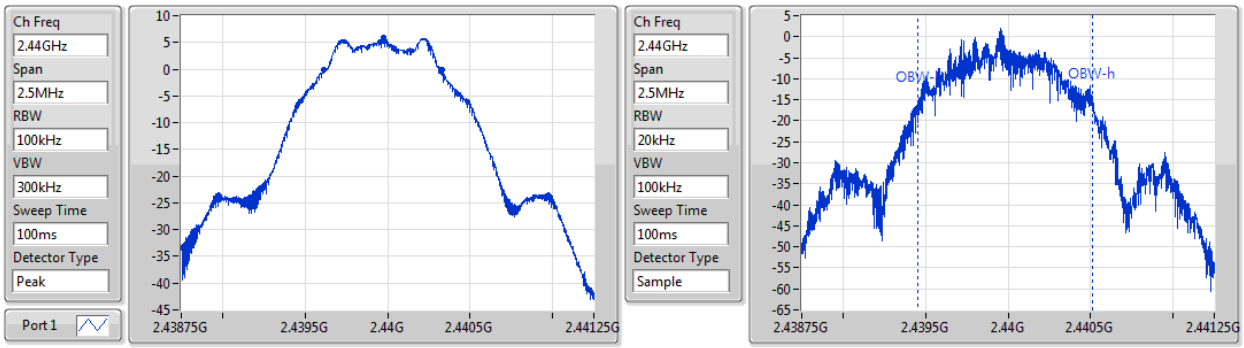


6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
715k	2.401623G	2.402338G	1.054M	2.401464G	2.402518G	500k	1

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

2440MHz

12/03/2018

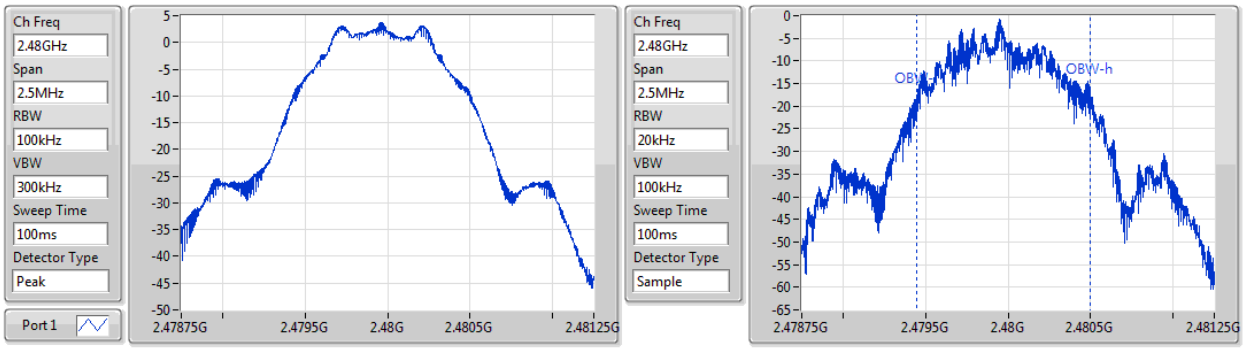


6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
711.25k	2.439616G	2.440328G	1.056M	2.439455G	2.440511G	500k	1

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

2480MHz

12/03/2018



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
707.5k	2.479608G	2.480315G	1.054M	2.479445G	2.4805G	500k	1

Summary

Mode	Power	Power
	(dBm)	(W)
2.4-2.4835GHz	-	-
BT-LE(1Mbps)	6.00	0.00398

Result

Mode	Result	Gain (dBi)	Power (dBm)	Power Limit (dBm)
BT-LE(1Mbps)	-	-	-	-
2402MHz_TnomVnom	Pass	6.02	1.93	29.98
2440MHz_TnomVnom	Pass	6.02	6.00	29.98
2480MHz_TnomVnom	Pass	6.02	3.28	29.98

Summary

Mode	PD (dBm/RBW)
2.4-2.4835GHz	-
BT-LE(1Mbps)	-7.82

RBW=3kHz.

Result

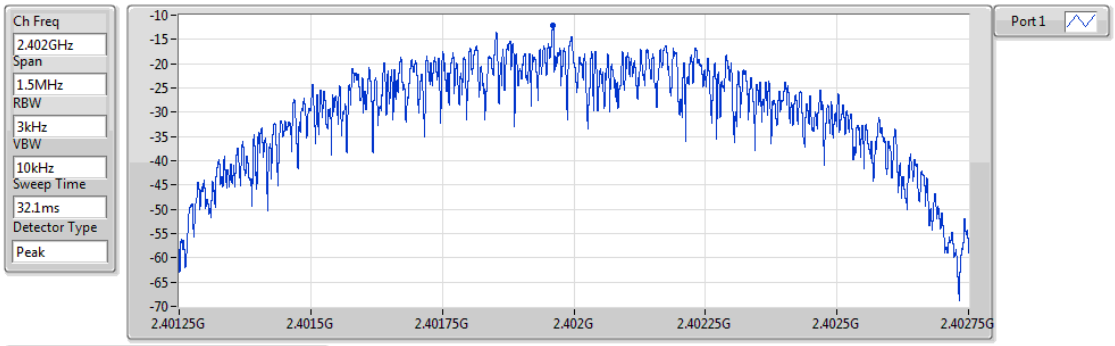
Mode	Result	Gain (dBi)	PD (dBm/RBW)	PD Limit (dBm/RBW)
BT-LE(1Mbps)	-	-	-	-
2402MHz_TnomVnom	Pass	6.02	-12.01	7.98
2440MHz_TnomVnom	Pass	6.02	-7.82	7.98
2480MHz_TnomVnom	Pass	6.02	-11.04	7.98

RBW=3kHz.

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

2402MHz

12/03/2018

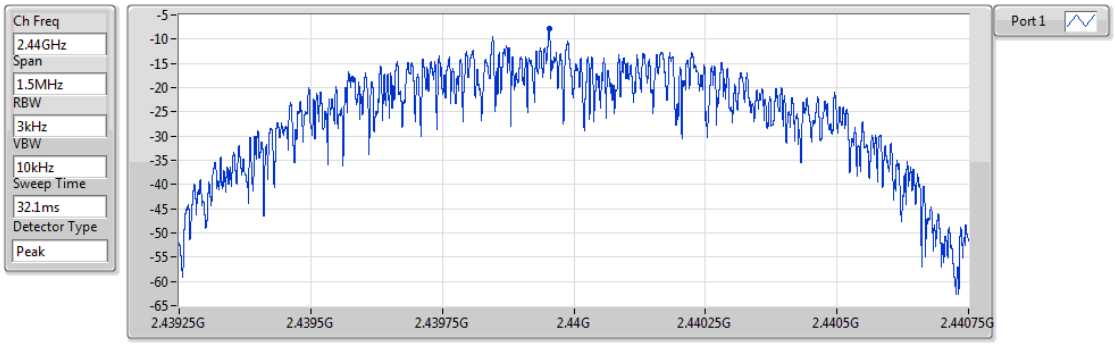


Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-12.01	-12.01	-12.01

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

2440MHz

12/03/2018

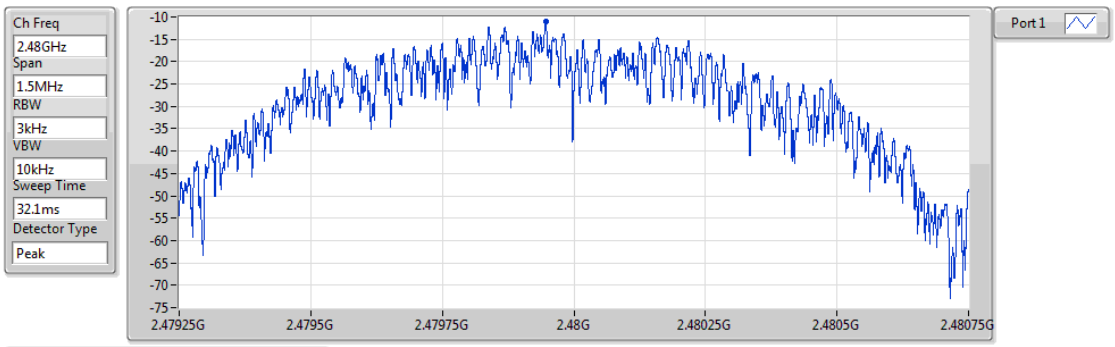


Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-7.82	-7.82	-7.82

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

2480MHz

12/03/2018



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-11.04	-11.04	-11.04

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	2.439746G	5.74	-24.26	48.944M	-31.58	2.39852G	-63.23	2.483652G	-62.53	15.349722G	-53.17	1

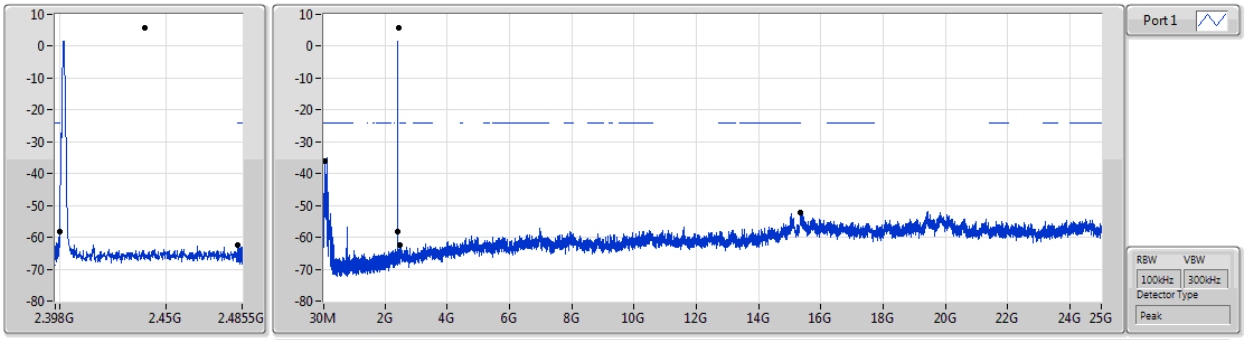
Result

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	2.439746G	5.74	-24.26	48.944M	-36.18	2.399976G	-58.32	2.483568G	-62.38	15.338465G	-52.23	1
2440MHz_TnomVnom	Pass	2.439746G	5.74	-24.26	48.944M	-31.58	2.39852G	-63.23	2.483652G	-62.53	15.349722G	-53.17	1
2480MHz_TnomVnom	Pass	2.439746G	5.74	-24.26	48.944M	-36.00	2.399092G	-62.50	2.483544G	-60.66	15.116135G	-52.63	1

BT-LE(1Mbps) **CSE NdB**

2402MHz

12/03/2018

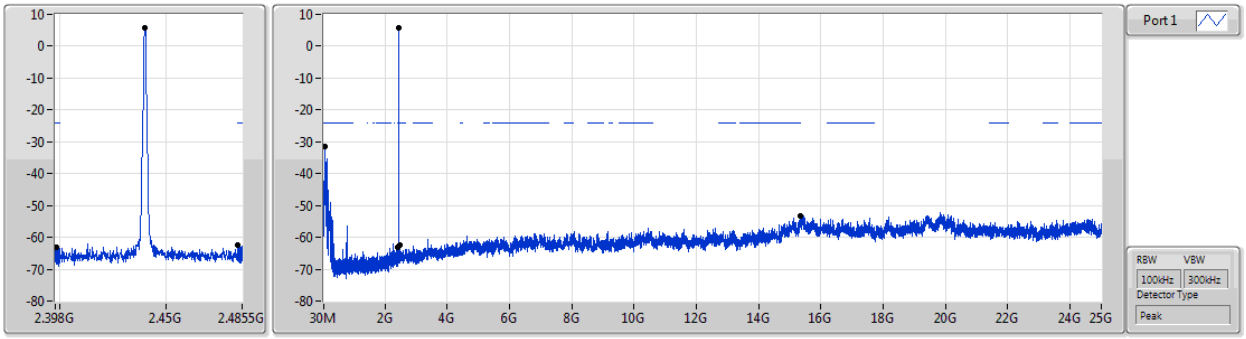


Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.439746G	5.74	-24.26	48.944M	-36.18	2.399976G	-58.32	2.483568G	-62.38	15.338465G	-52.23	1

BT-LE(1Mbps) **CSE NdB**

2440MHz

12/03/2018

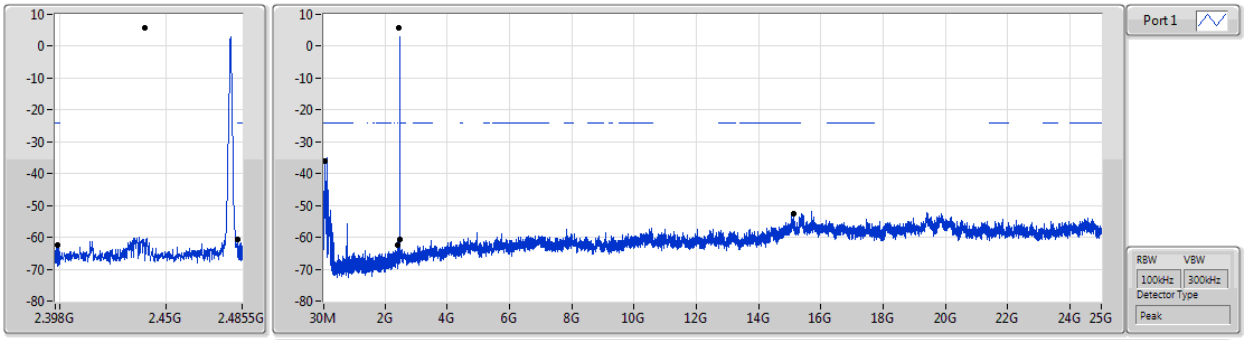


Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.439746G	5.74	-24.26	48.944M	-31.58	2.39852G	-63.23	2.483652G	-62.53	15.349722G	-53.17	1

BT-LE(1Mbps) **CSE NdB**

2480MHz

12/03/2018



Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.439746G	5.74	-24.26	48.944M	-36.00	2.399092G	-62.50	2.483544G	-60.66	15.116135G	-52.63	1

Summary

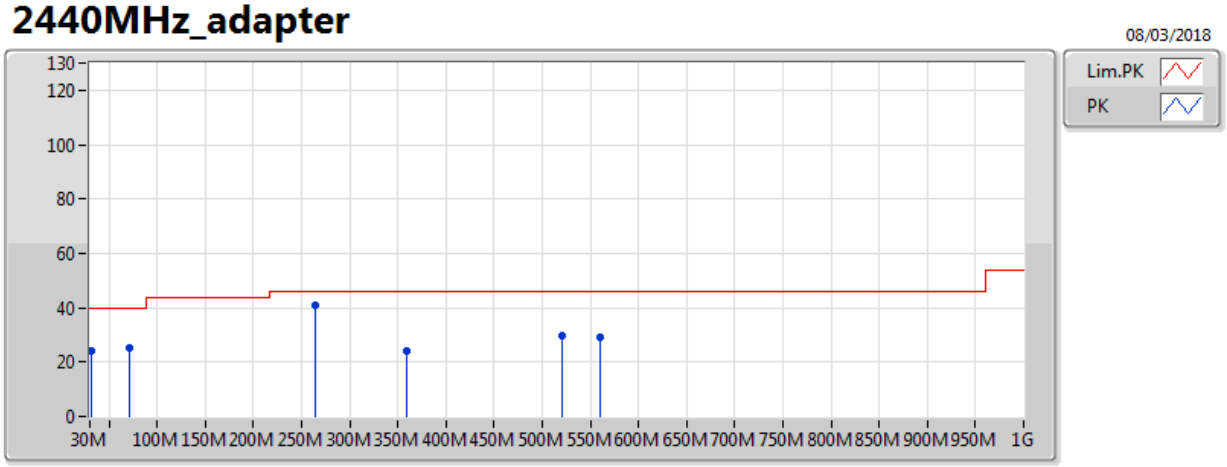
Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-	-
BT-LE(1Mbps)	Pass	PK	264.74M	41.49	46.00	-4.51	-15.97	3	Horizontal	360	1.00	-

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	57.16M	26.45	40.00	-13.55	-25.36	3	Horizontal	360	1.00	-
2440MHz	Pass	PK	154.16M	25.78	43.50	-17.72	-19.70	3	Horizontal	360	1.00	-
2440MHz	Pass	PK	264.74M	41.49	46.00	-4.51	-15.97	3	Horizontal	360	1.00	-
2440MHz	Pass	PK	326.82M	40.38	46.00	-5.62	-16.14	3	Horizontal	360	1.00	-
2440MHz	Pass	PK	402.48M	29.50	46.00	-16.50	-13.92	3	Horizontal	360	1.00	-
2440MHz	Pass	PK	485.9M	28.49	46.00	-17.51	-12.30	3	Horizontal	360	1.00	-
2440MHz	Pass	PK	31.94M	24.03	40.00	-15.97	-14.35	3	Vertical	0	1.00	-
2440MHz	Pass	PK	70.74M	25.49	40.00	-14.51	-25.07	3	Vertical	0	1.00	-
2440MHz	Pass	PK	264.74M	40.89	46.00	-5.11	-15.97	3	Vertical	0	1.00	-
2440MHz	Pass	PK	359.8M	23.89	46.00	-22.11	-15.20	3	Vertical	0	1.00	-
2440MHz	Pass	PK	520.82M	29.62	46.00	-16.38	-12.12	3	Vertical	0	1.00	-
2440MHz	Pass	PK	559.62M	29.09	46.00	-16.91	-10.29	3	Vertical	0	1.00	-

BT-LE(1Mbps)

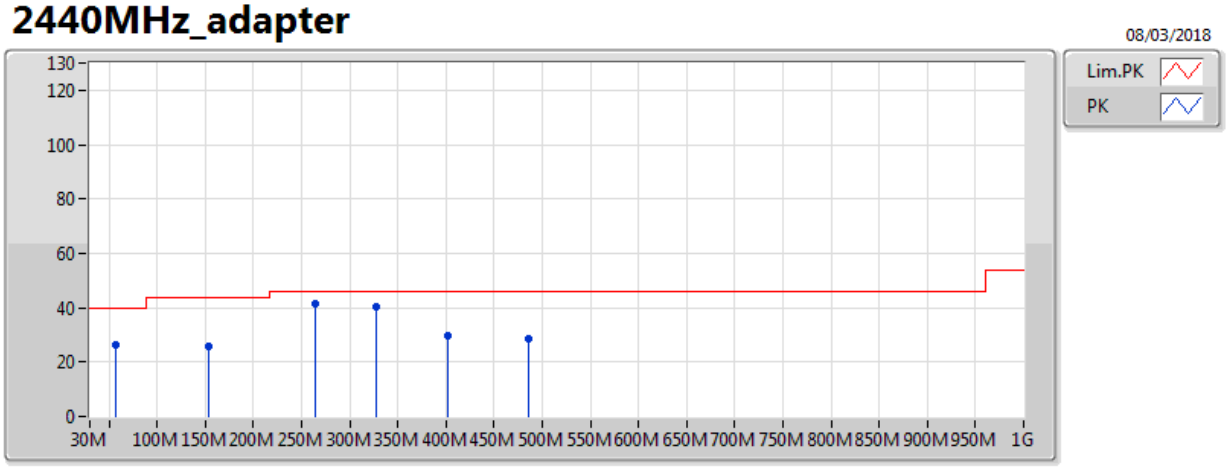
2440MHz_adapter



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	31.94M	24.03	40.00	-15.97	-14.35	3	Vertical	0	1.00	-	38.38	22.64	0.33	37.32
PK	70.74M	25.49	40.00	-14.51	-25.07	3	Vertical	0	1.00	-	50.56	11.45	0.48	37.00
PK	264.74M	40.89	46.00	-5.11	-15.97	3	Vertical	0	1.00	-	56.86	19.15	1.30	36.42
PK	359.8M	23.89	46.00	-22.11	-15.20	3	Vertical	0	1.00	-	39.09	19.84	1.49	36.54
PK	520.82M	29.62	46.00	-16.38	-12.12	3	Vertical	0	1.00	-	41.74	23.25	1.61	36.97
PK	559.62M	29.09	46.00	-16.91	-10.29	3	Vertical	0	1.00	-	39.38	25.17	1.62	37.08

BT-LE(1Mbps)

2440MHz_adapter



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	57.16M	26.45	40.00	-13.55	-25.36	3	Horizontal	360	1.00	-	51.81	11.30	0.44	37.10
PK	154.16M	25.78	43.50	-17.72	-19.70	3	Horizontal	360	1.00	-	45.48	16.06	0.82	36.57
PK	264.74M	41.49	46.00	-4.51	-15.97	3	Horizontal	360	1.00	-	57.46	19.15	1.30	36.42
PK	326.82M	40.38	46.00	-5.62	-16.14	3	Horizontal	360	1.00	-	56.52	18.87	1.47	36.48
PK	402.48M	29.50	46.00	-16.50	-13.92	3	Horizontal	360	1.00	-	43.42	21.18	1.52	36.62
PK	485.9M	28.49	46.00	-17.51	-12.30	3	Horizontal	360	1.00	-	40.79	22.99	1.59	36.88

Summary

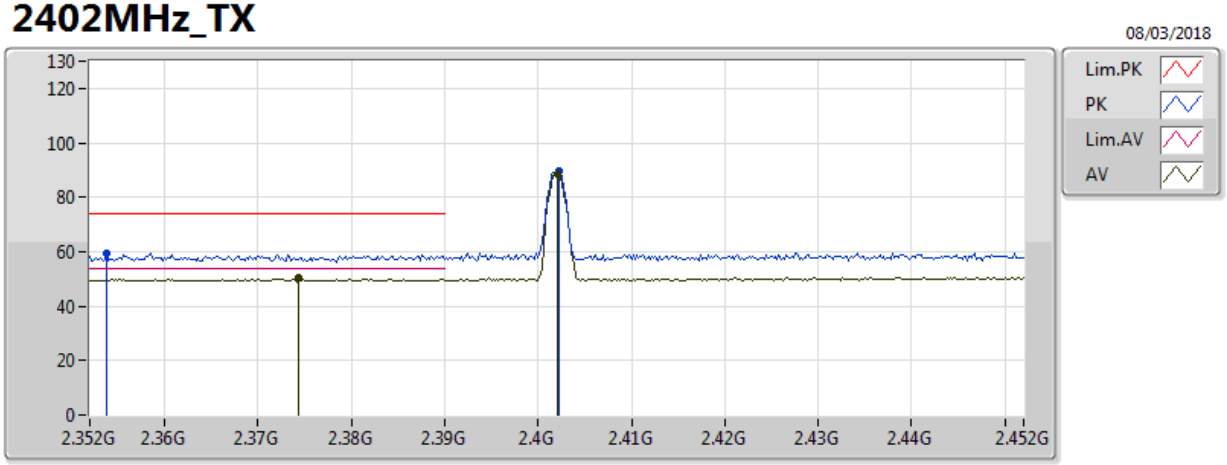
Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-	-
BT-LE(1Mbps)	Pass	AV	2.4984G	51.04	54.00	-2.96	35.44	3	Vertical	102	3.52	-

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	2.3604G	50.27	54.00	-3.73	34.78	3	Horizontal	162	3.54	-
2402MHz	Pass	AV	2.402G	94.24	Inf	-Inf	34.98	3	Horizontal	162	3.54	-
2402MHz	Pass	PK	2.3598G	59.59	74.00	-14.41	34.78	3	Horizontal	162	3.54	-
2402MHz	Pass	PK	2.4022G	95.07	Inf	-Inf	34.98	3	Horizontal	162	3.54	-
2402MHz	Pass	AV	2.3744G	50.19	54.00	-3.81	34.85	3	Vertical	76	3.54	-
2402MHz	Pass	AV	2.402G	88.64	Inf	-Inf	34.98	3	Vertical	76	3.54	-
2402MHz	Pass	PK	2.3538G	59.56	74.00	-14.44	34.75	3	Vertical	76	3.54	-
2402MHz	Pass	PK	2.4022G	89.54	Inf	-Inf	34.98	3	Vertical	76	3.54	-
2402MHz	Pass	AV	4.79962G	36.37	54.00	-17.63	6.27	3	Horizontal	45	1.50	-
2402MHz	Pass	PK	4.79578G	47.40	74.00	-26.60	6.26	3	Horizontal	45	1.50	-
2402MHz	Pass	AV	4.79512G	36.30	54.00	-17.70	6.26	3	Vertical	211	1.50	-
2402MHz	Pass	PK	4.79194G	47.31	74.00	-26.69	6.25	3	Vertical	211	1.50	-
2440MHz	Pass	AV	2.366G	50.09	54.00	-3.91	34.81	3	Horizontal	162	3.48	-
2440MHz	Pass	AV	2.44G	100.15	Inf	-Inf	35.16	3	Horizontal	162	3.48	-
2440MHz	Pass	AV	2.499998G	51.03	54.00	-2.97	35.44	3	Horizontal	162	3.48	-
2440MHz	Pass	PK	2.3424G	59.28	74.00	-14.72	34.70	3	Horizontal	162	3.48	-
2440MHz	Pass	PK	2.4396G	100.93	Inf	-Inf	35.16	3	Horizontal	162	3.48	-
2440MHz	Pass	PK	2.4876G	60.20	74.00	-13.80	35.39	3	Horizontal	162	3.48	-
2440MHz	Pass	AV	2.3704G	49.94	54.00	-4.06	34.83	3	Vertical	102	3.52	-
2440MHz	Pass	AV	2.44G	96.22	Inf	-Inf	35.16	3	Vertical	102	3.52	-
2440MHz	Pass	AV	2.4984G	51.04	54.00	-2.96	35.44	3	Vertical	102	3.52	-
2440MHz	Pass	PK	2.389998G	59.78	74.00	-14.22	34.92	3	Vertical	102	3.52	-
2440MHz	Pass	PK	2.4396G	97.12	Inf	-Inf	35.16	3	Vertical	102	3.52	-
2440MHz	Pass	PK	2.4948G	59.77	74.00	-14.23	35.42	3	Vertical	102	3.52	-
2440MHz	Pass	AV	4.88726G	36.43	54.00	-17.57	6.45	3	Horizontal	302	3.52	-
2440MHz	Pass	PK	4.8941G	47.52	74.00	-26.48	6.47	3	Horizontal	302	3.52	-
2440MHz	Pass	AV	4.88798G	36.42	54.00	-17.58	6.45	3	Vertical	360	3.52	-
2440MHz	Pass	PK	4.886G	47.47	74.00	-26.53	6.45	3	Vertical	360	3.52	-
2480MHz	Pass	AV	2.48G	92.06	Inf	-Inf	35.35	3	Horizontal	359	3.34	-
2480MHz	Pass	AV	2.4892G	50.97	54.00	-3.03	35.39	3	Horizontal	359	3.34	-
2480MHz	Pass	PK	2.4798G	92.81	Inf	-Inf	35.35	3	Horizontal	359	3.34	-
2480MHz	Pass	PK	2.4848G	60.15	74.00	-13.85	35.37	3	Horizontal	359	3.34	-
2480MHz	Pass	AV	2.48G	92.15	Inf	-Inf	35.35	3	Vertical	101	3.45	-
2480MHz	Pass	AV	2.4882G	50.76	54.00	-3.24	35.39	3	Vertical	101	3.45	-
2480MHz	Pass	PK	2.4798G	93.01	Inf	-Inf	35.35	3	Vertical	101	3.45	-
2480MHz	Pass	PK	2.4884G	59.58	74.00	-14.42	35.39	3	Vertical	101	3.45	-
2480MHz	Pass	AV	4.97278G	36.90	54.00	-17.10	6.64	3	Horizontal	97	1.50	-
2480MHz	Pass	PK	4.97176G	48.65	74.00	-25.35	6.64	3	Horizontal	97	1.50	-
2480MHz	Pass	AV	4.9744G	36.89	54.00	-17.11	6.64	3	Vertical	268	1.50	-
2480MHz	Pass	PK	4.97224G	48.89	74.00	-25.11	6.64	3	Vertical	268	1.50	-

BT-LE(1Mbps)

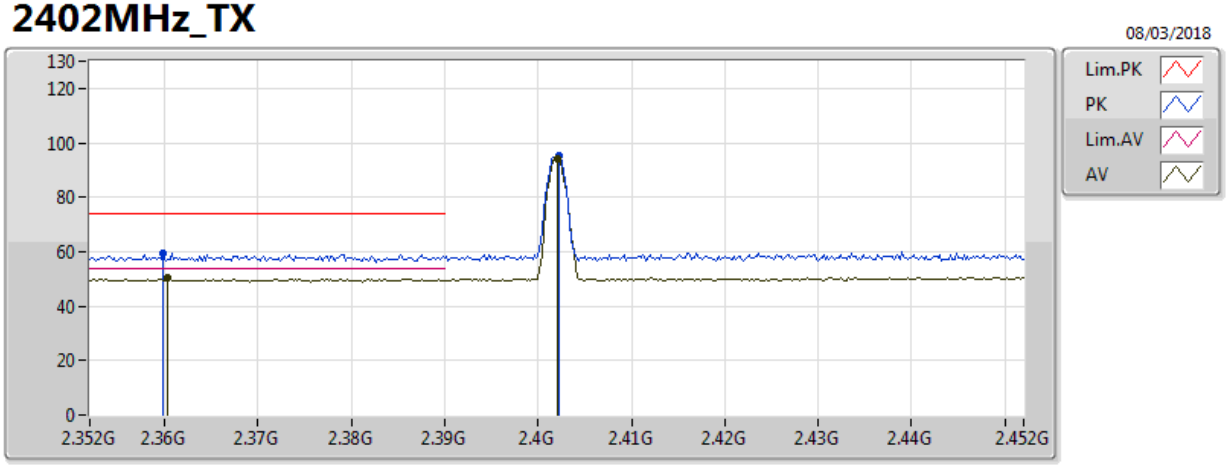
2402MHz_TX



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)
AV	2.3744G	50.19	54.00	-3.81	34.85	3	Vertical	76	3.54	-	15.34	26.95	7.90	-
AV	2.402G	88.64	Inf	-Inf	34.98	3	Vertical	76	3.54	-	53.66	27.03	7.95	-
PK	2.3538G	59.56	74.00	-14.44	34.75	3	Vertical	76	3.54	-	24.81	26.89	7.86	-
PK	2.4022G	89.54	Inf	-Inf	34.98	3	Vertical	76	3.54	-	54.56	27.03	7.95	-

BT-LE(1Mbps)

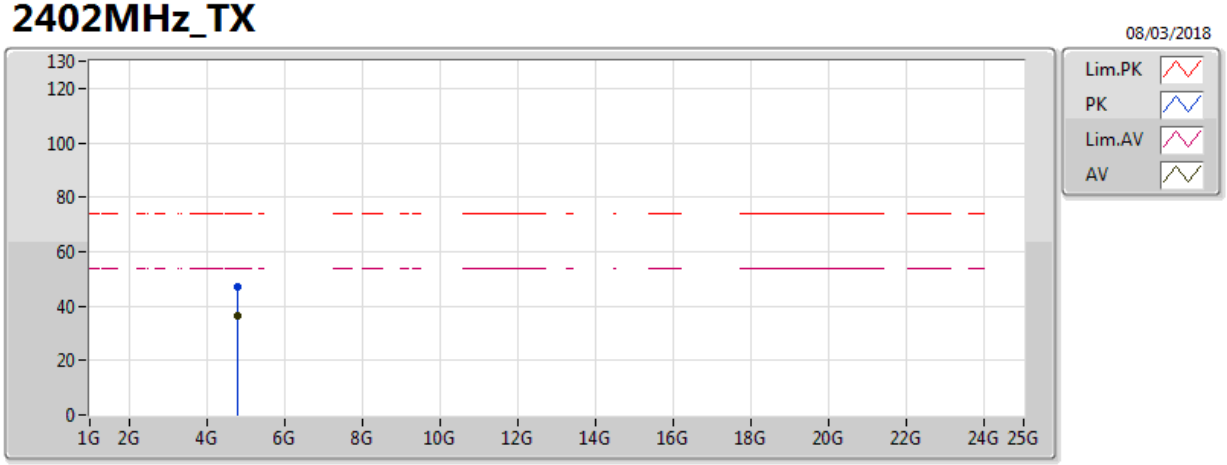
2402MHz_TX



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)
AV	2.3604G	50.27	54.00	-3.73	34.78	3	Horizontal	162	3.54	-	15.49	26.91	7.87	-
AV	2.402G	94.24	Inf	-Inf	34.98	3	Horizontal	162	3.54	-	59.26	27.03	7.95	-
PK	2.3598G	59.59	74.00	-14.41	34.78	3	Horizontal	162	3.54	-	24.81	26.91	7.87	-
PK	2.4022G	95.07	Inf	-Inf	34.98	3	Horizontal	162	3.54	-	60.09	27.03	7.95	-

BT-LE(1Mbps)

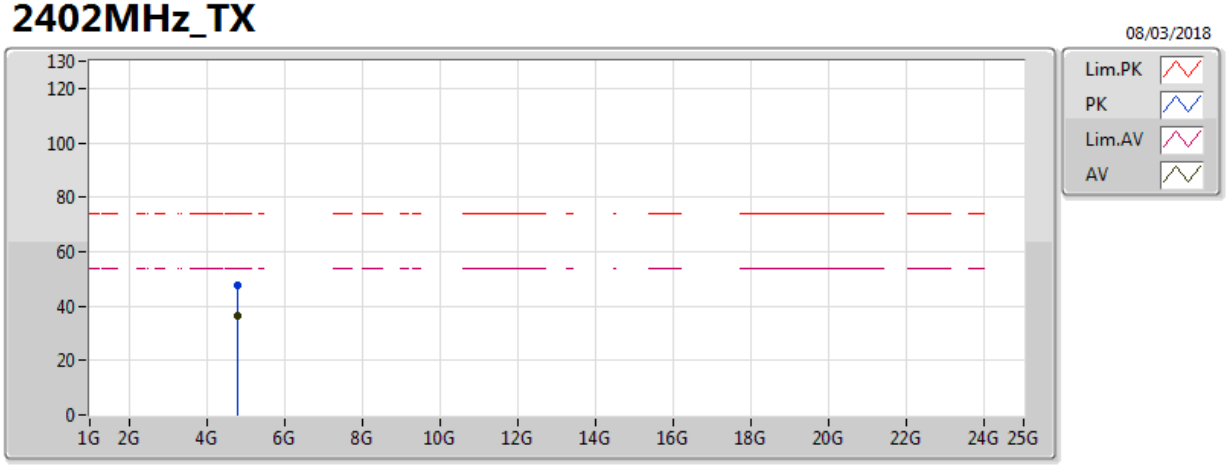
2402MHz_TX



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)
AV	4.79512G	36.30	54.00	-17.70	6.26	3	Vertical	211	1.50	-	30.04	31.17	10.26	35.17
PK	4.79194G	47.31	74.00	-26.69	6.25	3	Vertical	211	1.50	-	41.06	31.17	10.25	35.17

BT-LE(1Mbps)

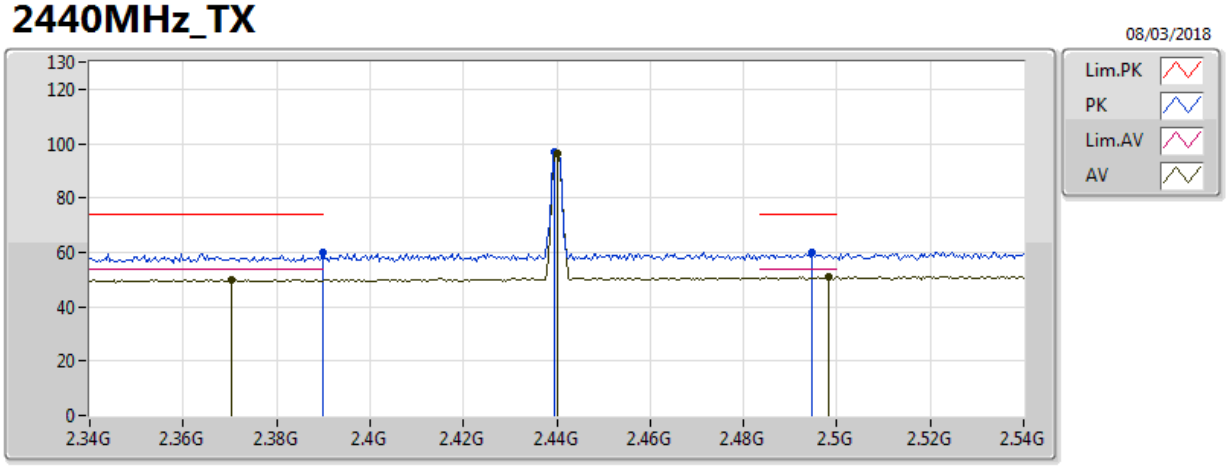
2402MHz_TX



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)
AV	4.79962G	36.37	54.00	-17.63	6.27	3	Horizontal	45	1.50	-	30.10	31.18	10.26	35.17
PK	4.79578G	47.40	74.00	-26.60	6.26	3	Horizontal	45	1.50	-	41.14	31.17	10.26	35.17

BT-LE(1Mbps)

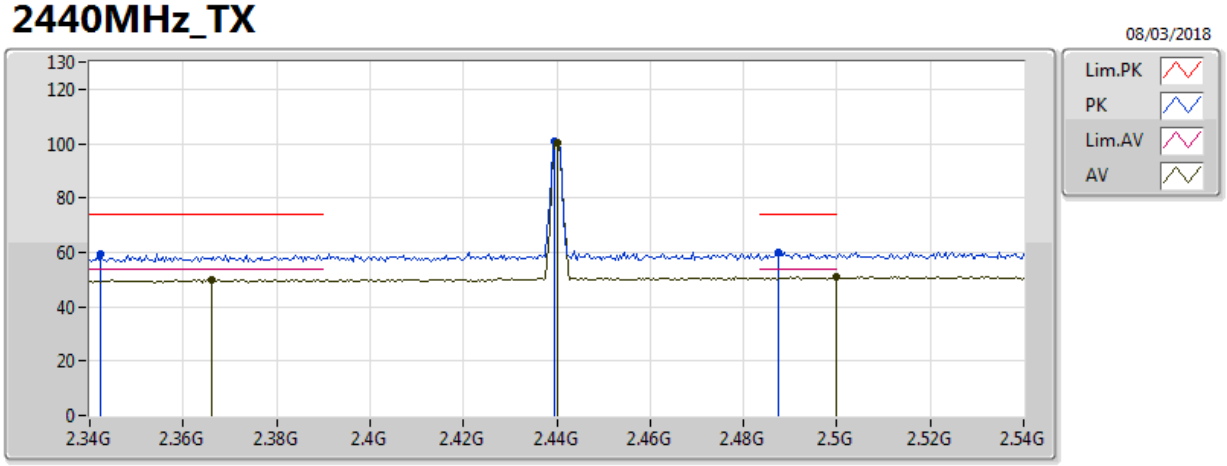
2440MHz_TX



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)
AV	2.3704G	49.94	54.00	-4.06	34.83	3	Vertical	102	3.52	-	15.11	26.94	7.89	-
AV	2.44G	96.22	Inf	-Inf	35.16	3	Vertical	102	3.52	-	61.06	27.13	8.03	-
AV	2.4984G	51.04	54.00	-2.96	35.44	3	Vertical	102	3.52	-	15.60	27.30	8.14	-
PK	2.389998G	59.78	74.00	-14.22	34.92	3	Vertical	102	3.52	-	24.86	26.99	7.93	-
PK	2.4396G	97.12	Inf	-Inf	35.16	3	Vertical	102	3.52	-	61.96	27.13	8.03	-
PK	2.4948G	59.77	74.00	-14.23	35.42	3	Vertical	102	3.52	-	24.35	27.29	8.13	-

BT-LE(1Mbps)

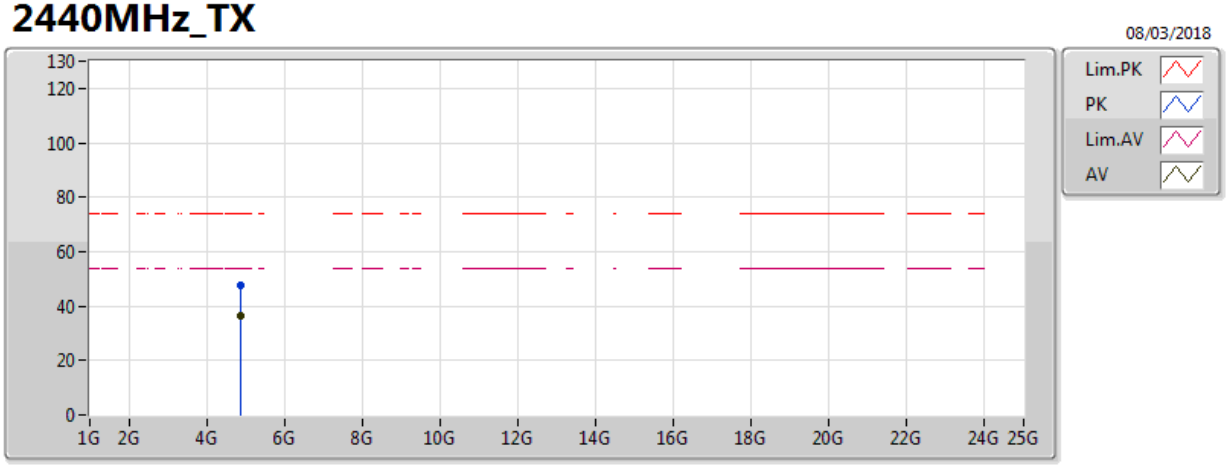
2440MHz_TX



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)
AV	2.366G	50.09	54.00	-3.91	34.81	3	Horizontal	162	3.48	-	15.28	26.92	7.89	-
AV	2.44G	100.15	Inf	-Inf	35.16	3	Horizontal	162	3.48	-	64.99	27.13	8.03	-
AV	2.499998G	51.03	54.00	-2.97	35.44	3	Horizontal	162	3.48	-	15.59	27.30	8.14	-
PK	2.3424G	59.28	74.00	-14.72	34.70	3	Horizontal	162	3.48	-	24.58	26.86	7.84	-
PK	2.4396G	100.93	Inf	-Inf	35.16	3	Horizontal	162	3.48	-	65.77	27.13	8.03	-
PK	2.4876G	60.20	74.00	-13.80	35.39	3	Horizontal	162	3.48	-	24.81	27.27	8.12	-

BT-LE(1Mbps)

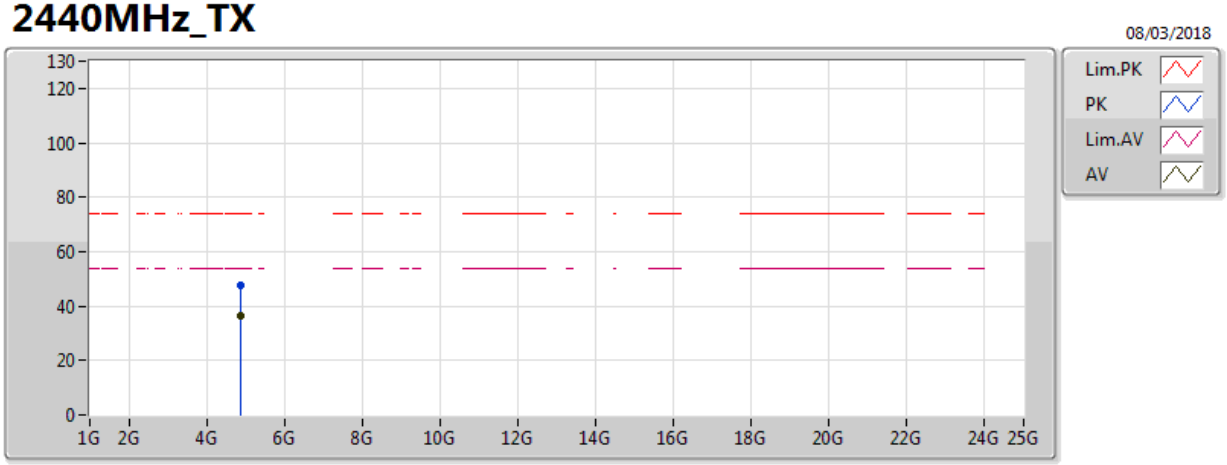
2440MHz_TX



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)
AV	4.88798G	36.42	54.00	-17.58	6.45	3	Vertical	360	3.52	-	29.97	31.32	10.33	35.20
PK	4.886G	47.47	74.00	-26.53	6.45	3	Vertical	360	3.52	-	41.02	31.32	10.33	35.20

BT-LE(1Mbps)

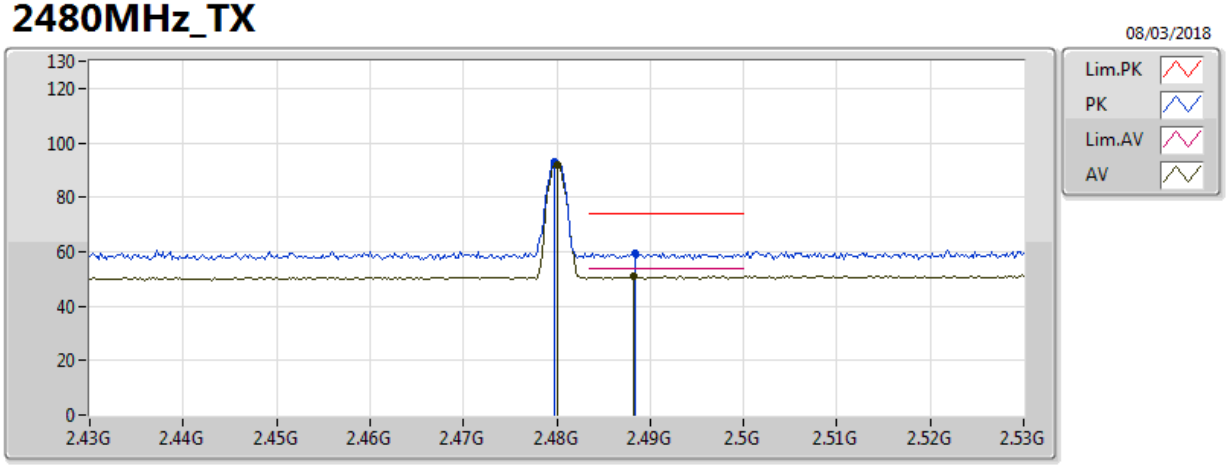
2440MHz_TX



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)
AV	4.88726G	36.43	54.00	-17.57	6.45	3	Horizontal	302	3.52	-	29.98	31.32	10.33	35.20
PK	4.8941G	47.52	74.00	-26.48	6.47	3	Horizontal	302	3.52	-	41.05	31.33	10.34	35.20

BT-LE(1Mbps)

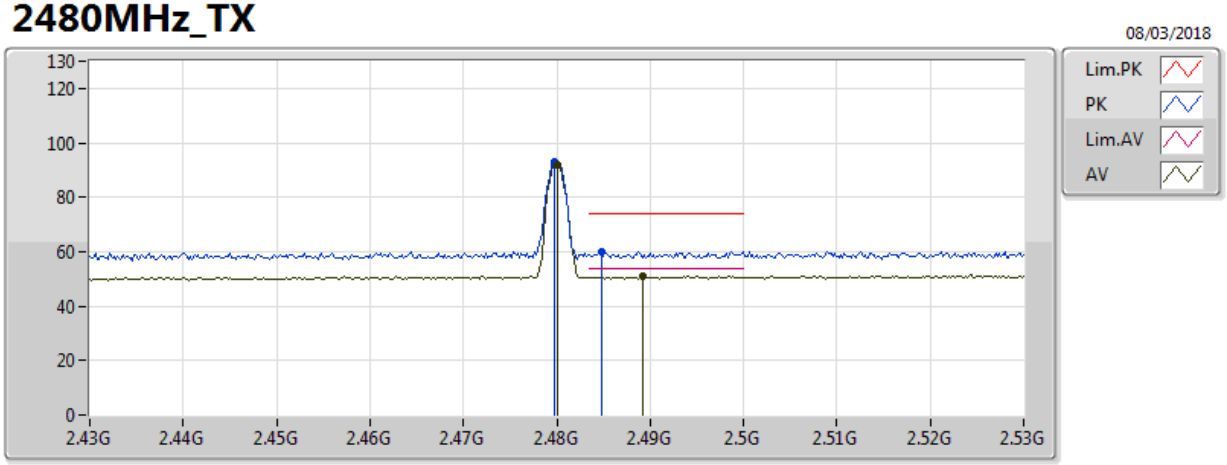
2480MHz_TX



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)
AV	2.48G	92.15	Inf	-Inf	35.35	3	Vertical	101	3.45	-	56.80	27.24	8.10	-
AV	2.4882G	50.76	54.00	-3.24	35.39	3	Vertical	101	3.45	-	15.37	27.27	8.12	-
PK	2.4798G	93.01	Inf	-Inf	35.35	3	Vertical	101	3.45	-	57.66	27.24	8.10	-
PK	2.4884G	59.58	74.00	-14.42	35.39	3	Vertical	101	3.45	-	24.19	27.27	8.12	-

BT-LE(1Mbps)

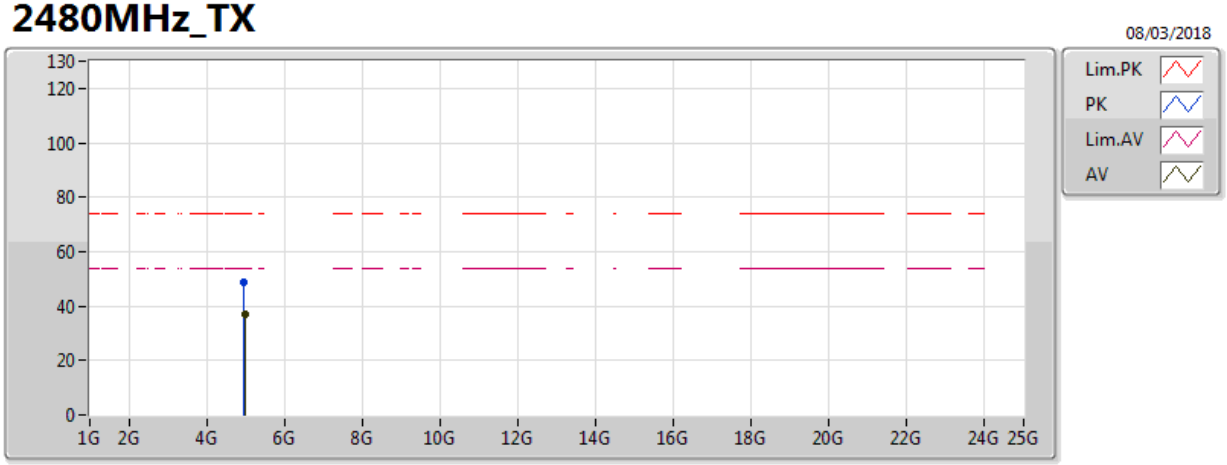
2480MHz_TX



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)
AV	2.48G	92.06	Inf	-Inf	35.35	3	Horizontal	359	3.34	-	56.71	27.24	8.10	-
AV	2.4892G	50.97	54.00	-3.03	35.39	3	Horizontal	359	3.34	-	15.58	27.27	8.12	-
PK	2.4798G	92.81	Inf	-Inf	35.35	3	Horizontal	359	3.34	-	57.46	27.24	8.10	-
PK	2.4848G	60.15	74.00	-13.85	35.37	3	Horizontal	359	3.34	-	24.78	27.26	8.11	-

BT-LE(1Mbps)

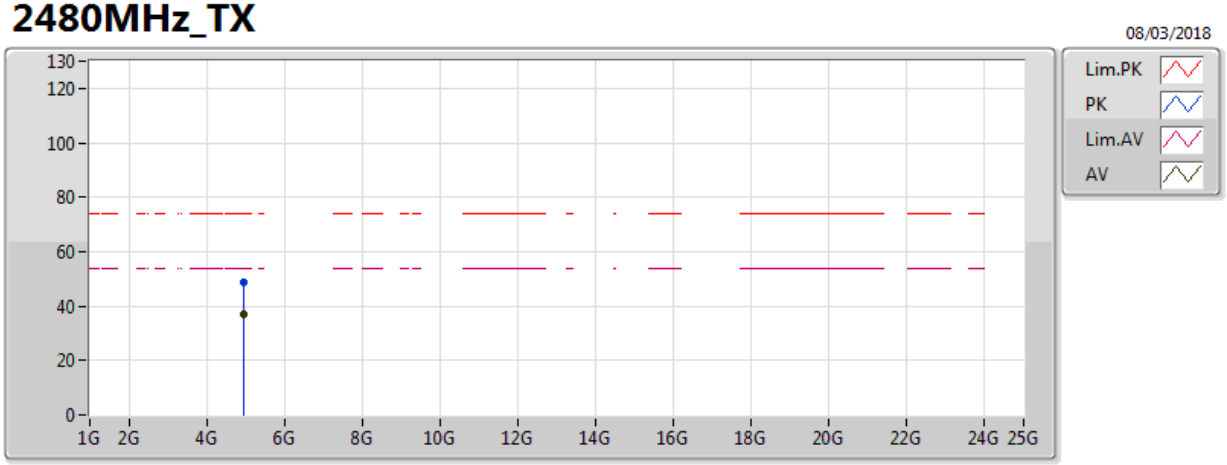
2480MHz_TX



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)
AV	4.9744G	36.89	54.00	-17.11	6.64	3	Vertical	268	1.50	-	30.25	31.46	10.40	35.21
PK	4.97224G	48.89	74.00	-25.11	6.64	3	Vertical	268	1.50	-	42.25	31.46	10.40	35.21

BT-LE(1Mbps)

2480MHz_TX



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)
AV	4.97278G	36.90	54.00	-17.10	6.64	3	Horizontal	97	1.50	-	30.26	31.46	10.40	35.21
PK	4.97176G	48.65	74.00	-25.35	6.64	3	Horizontal	97	1.50	-	42.01	31.45	10.40	35.21

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	35.82M	33.85	40.00	-6.15	-16.27	3	Vertical	360	1.00	-

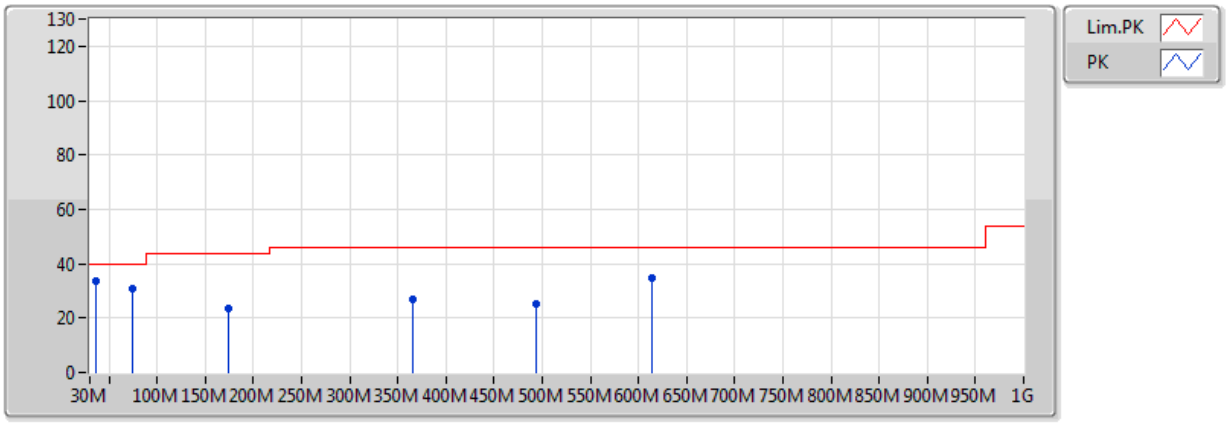
Result

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	74.62M	22.39	40.00	-17.61	-24.78	3	Horizontal	0	1.00	-
2440MHz	Pass	PK	173.56M	30.96	43.50	-12.54	-20.94	3	Horizontal	0	1.00	-
2440MHz	Pass	PK	210.42M	31.75	43.50	-11.75	-20.98	3	Horizontal	0	1.00	-
2440MHz	Pass	PK	319.06M	34.74	46.00	-11.26	-16.38	3	Horizontal	0	1.00	-
2440MHz	Pass	PK	402.48M	35.72	46.00	-10.28	-13.92	3	Horizontal	0	1.00	-
2440MHz	Pass	PK	491.72M	28.55	46.00	-17.45	-12.21	3	Horizontal	0	1.00	-
2440MHz	Pass	PK	35.82M	33.85	40.00	-6.15	-16.27	3	Vertical	360	1.00	-
2440MHz	Pass	PK	74.62M	30.92	40.00	-9.08	-24.78	3	Vertical	360	1.00	-
2440MHz	Pass	PK	173.56M	23.55	43.50	-19.95	-20.94	3	Vertical	360	1.00	-
2440MHz	Pass	PK	365.62M	26.93	46.00	-19.07	-15.06	3	Vertical	360	1.00	-
2440MHz	Pass	PK	493.66M	25.34	46.00	-20.66	-12.19	3	Vertical	360	1.00	-
2440MHz	Pass	PK	613.94M	34.88	46.00	-11.12	-10.46	3	Vertical	360	1.00	-

BT-LE(1Mbps)RX

2440MHz_adapter

08/03/2018

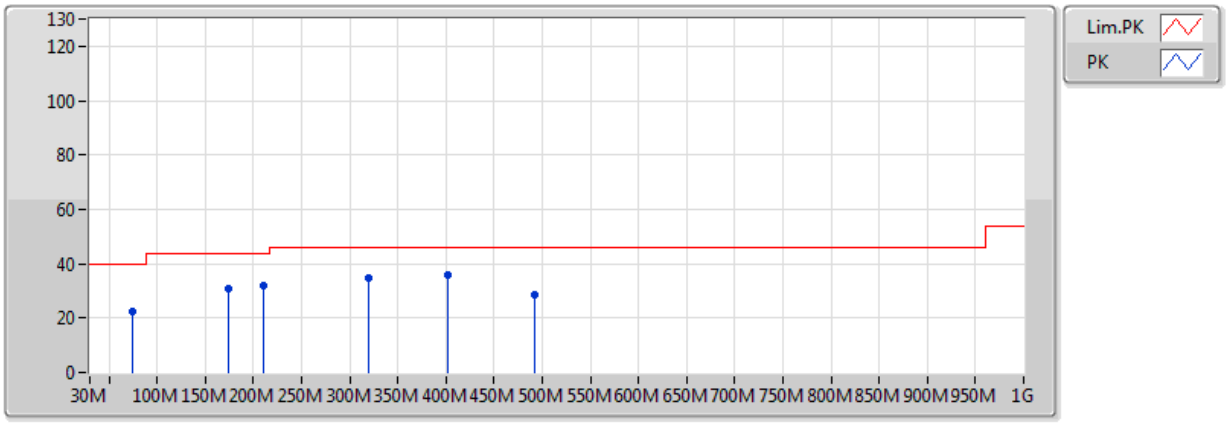


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comments	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
PK	35.82M	33.85	40.00	-6.15	-16.27	3	Vertical	360	1.00	-	50.12	20.65	0.36	37.28
PK	74.62M	30.92	40.00	-9.08	-24.78	3	Vertical	360	1.00	-	55.70	11.71	0.49	36.98
PK	173.56M	23.55	43.50	-19.95	-20.94	3	Vertical	360	1.00	-	44.49	14.55	1.00	36.49
PK	365.62M	26.93	46.00	-19.07	-15.06	3	Vertical	360	1.00	-	41.99	20.00	1.50	36.55
PK	493.66M	25.34	46.00	-20.66	-12.19	3	Vertical	360	1.00	-	37.53	23.12	1.59	36.90
PK	613.94M	34.88	46.00	-11.12	-10.46	3	Vertical	360	1.00	-	45.34	25.09	1.67	37.21

BT-LE(1Mbps)RX

2440MHz_adapter

08/03/2018



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	74.62M	22.39	40.00	-17.61	-24.78	3	Horizontal	0	1.00	-	47.17	11.71	0.49	36.98
PK	173.56M	30.96	43.50	-12.54	-20.94	3	Horizontal	0	1.00	-	51.90	14.55	1.00	36.49
PK	210.42M	31.75	43.50	-11.75	-20.98	3	Horizontal	0	1.00	-	52.73	14.24	1.17	36.39
PK	319.06M	34.74	46.00	-11.26	-16.38	3	Horizontal	0	1.00	-	51.12	18.63	1.46	36.47
PK	402.48M	35.72	46.00	-10.28	-13.92	3	Horizontal	0	1.00	-	49.64	21.18	1.52	36.62
PK	491.72M	28.55	46.00	-17.45	-12.21	3	Horizontal	0	1.00	-	40.76	23.09	1.59	36.90

Summary

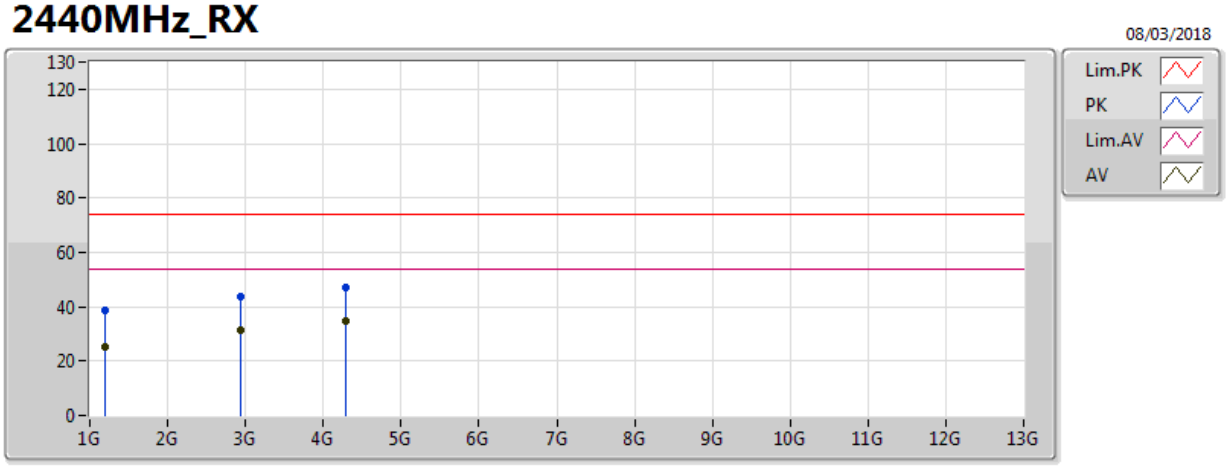
Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-	-
BT-LE(1Mbps)	Pass	AV	4.28G	34.60	54.00	-19.40	4.97	3	Vertical	0	1.00	-

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	AV	1.416G	26.19	54.00	-27.81	-4.07	3	Horizontal	360	1.00	-
2440MHz	Pass	AV	2.984G	31.73	54.00	-22.27	1.97	3	Horizontal	360	1.00	-
2440MHz	Pass	AV	4.376G	34.22	54.00	-19.78	5.26	3	Horizontal	360	1.00	-
2440MHz	Pass	PK	1.416G	39.92	74.00	-34.08	-4.07	3	Horizontal	360	1.00	-
2440MHz	Pass	PK	2.984G	45.63	74.00	-28.37	1.97	3	Horizontal	360	1.00	-
2440MHz	Pass	PK	4.376G	49.03	74.00	-24.97	5.26	3	Horizontal	360	1.00	-
2440MHz	Pass	AV	1.2G	25.31	54.00	-28.69	-5.37	3	Vertical	0	1.00	-
2440MHz	Pass	AV	2.936G	31.54	54.00	-22.46	1.80	3	Vertical	0	1.00	-
2440MHz	Pass	AV	4.28G	34.60	54.00	-19.40	4.97	3	Vertical	0	1.00	-
2440MHz	Pass	PK	1.2G	38.49	74.00	-35.51	-5.37	3	Vertical	0	1.00	-
2440MHz	Pass	PK	2.936G	43.67	74.00	-30.33	1.80	3	Vertical	0	1.00	-
2440MHz	Pass	PK	4.28G	47.13	74.00	-26.87	4.97	3	Vertical	0	1.00	-

BT-LE(1Mbps)RX

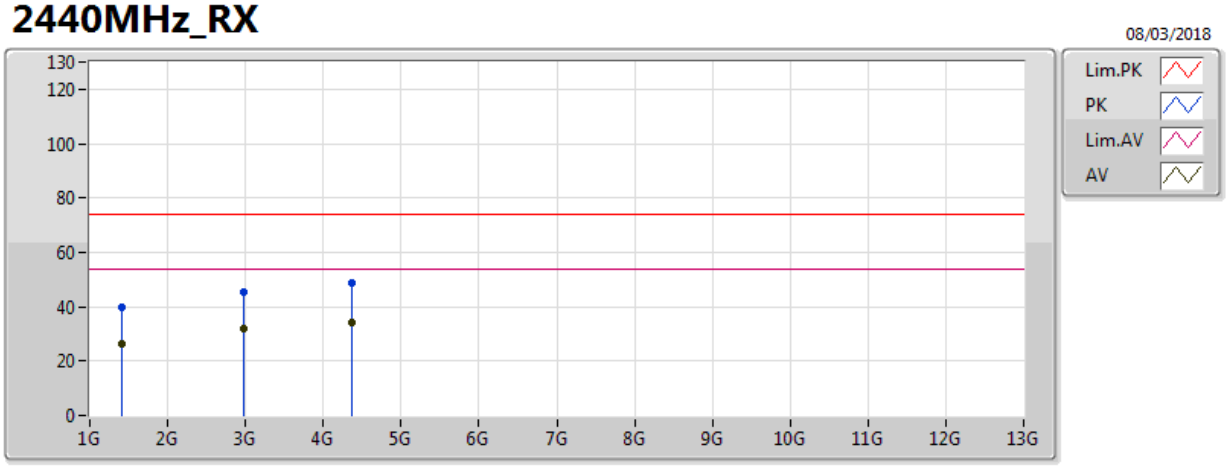
2440MHz_RX



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)
AV	1.2G	25.31	54.00	-28.69	-5.37	3	Vertical	0	1.00	-	30.68	24.80	5.66	35.83
AV	2.936G	31.54	54.00	-22.46	1.80	3	Vertical	0	1.00	-	29.74	28.43	8.72	35.35
AV	4.28G	34.60	54.00	-19.40	4.97	3	Vertical	0	1.00	-	29.63	30.22	9.90	35.15
PK	1.2G	38.49	74.00	-35.51	-5.37	3	Vertical	0	1.00	-	43.86	24.80	5.66	35.83
PK	2.936G	43.67	74.00	-30.33	1.80	3	Vertical	0	1.00	-	41.87	28.43	8.72	35.35
PK	4.28G	47.13	74.00	-26.87	4.97	3	Vertical	0	1.00	-	42.16	30.22	9.90	35.15

BT-LE(1Mbps)RX

2440MHz_RX



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)
AV	1.416G	26.19	54.00	-27.81	-4.07	3	Horizontal	360	1.00	-	30.27	25.23	6.12	35.43
AV	2.984G	31.73	54.00	-22.27	1.97	3	Horizontal	360	1.00	-	29.75	28.56	8.78	35.37
AV	4.376G	34.22	54.00	-19.78	5.26	3	Horizontal	360	1.00	-	28.96	30.43	9.96	35.12
PK	1.416G	39.92	74.00	-34.08	-4.07	3	Horizontal	360	1.00	-	43.99	25.23	6.12	35.43
PK	2.984G	45.63	74.00	-28.37	1.97	3	Horizontal	360	1.00	-	43.66	28.56	8.78	35.37
PK	4.376G	49.03	74.00	-24.97	5.26	3	Horizontal	360	1.00	-	43.77	30.43	9.96	35.12