Testing Laboratory 1190

FCC Test Report

FCC ID	:	2AEIM-1509518D
Equipment	:	B-pillar Endpoint
Brand Name	:	Tesla
Model Name	:	1509518D
Applicant/ Manufacturer	:	Tesla Motors, Inc. 3500 Deer Creek Road Palo Alto, California US 94304 United States Of America
Standard	:	47 CFR FCC Part 15.247

The product was received on Oct. 28, 2019, and testing was started from Oct. 29, 2019 and completed on Nov. 18, 2019. We, SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.10-2013 and shown compliance with the applicable technical standards.

The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any agency of government.

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

Approved by: Phoenix Chen

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory

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

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History of this test report

Report No.	Version	Description	Issued Date
FR9O2512-01AL	01	Initial issue of report	Jan. 22, 2020

Summary of Test Result

Report Clause	Ref.Std. Clause	Test Items	Result (PASS/FAIL)	Remark
1.1.2	15.203	Antenna Requirement	PASS	-
3.1	15.207	AC Power-line Conducted Emissions	PASS	-
3.2	15.247(a)	DTS Bandwidth	PASS	-
3.3	15.247(b)	Maximum Conducted Output Power	PASS	-
3.4	15.247(e)	Power Spectral Density	PASS	-
3.5	15.247(d)	Emissions in Non-restricted Frequency Bands	PASS	-
3.6	15.247(d)	Emissions in Restricted Frequency Bands	PASS	-

Note : From Sporton Project No.:FR9O2512AL

Declaration of Conformity:
The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.
Comments and explanations:
None

Reviewed by: Sam Tsai

Report Producer: Kate Lo

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	Gain (dBi)
1	1	-	-	PCB	N/A	5.21

For BT function:

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

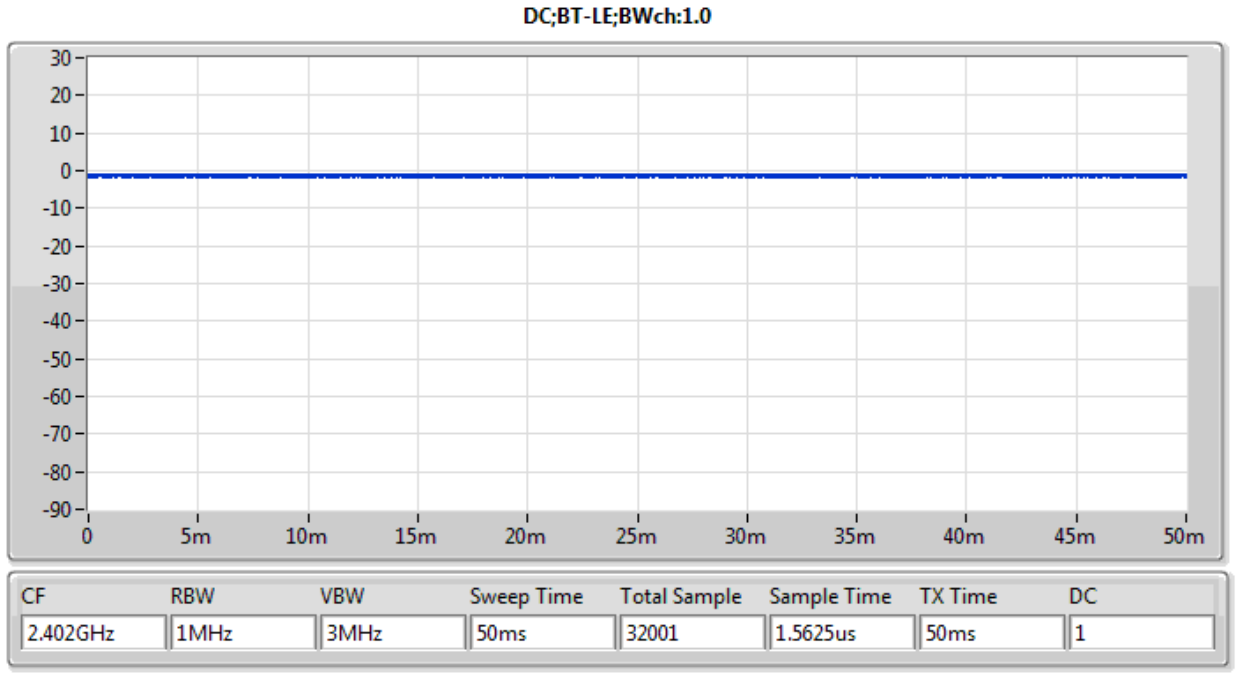
Ant. 1 (port 1) could transmit/receive.

1.1.3 EUT Information

Operational Condition				
EUT Power Type	DC Power Supply			
EUT Function	☒	Point-to-multipoint	☐	Point-to-point
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)	1	0	n/a (DC>=0.98)	10Hz



Note. If DC < 0.98, the DCF was added while measuring Output power and PSD.

1.2 Testing Applied Standards

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

- 47 CFR FCC Part 15
- ANSI C63.10-2013
- KDB 558074 D01 v05r02
- KDB 414788 D01 v01r01

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
Test site Designation No. TW1190 with FCC.			
☐	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	Edward	22.4~23.6°C / 68.5~72.9%	29/Oct/2019
RF Conducted	TH06-HY	Alan	21.4~23.3°C / 65~69%	30/Oct/2019
Radiated	03CH03-HY	Patrick	24.5~25.6°C / 52.8~54.5%	30/Oct/2019~ 18/Nov/2019

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)	3.54 dB	Confidence levels of 95%
Radiated Emission (9kHz ~ 30MHz)	1.6 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
TnomVnom	Tnom	20°C
-	Vnom	120V

2.2 Test Channel Mode

Test Software Version	BTool v1.41.11

Mode	Power Setting
BT-LE(1Mbps)	-
2402MHz	0xC
2440MHz	0xC
2480MHz	0xC

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	Continuously Transmits
1	DC Power Supply mode

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

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

2.4 Support Equipment

Support Equipment – AC Conduction				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
1	AC Power cable	Power sync	PW-GPC180-3	-
2	DC Power Supply	GW	GPC-6030D	-

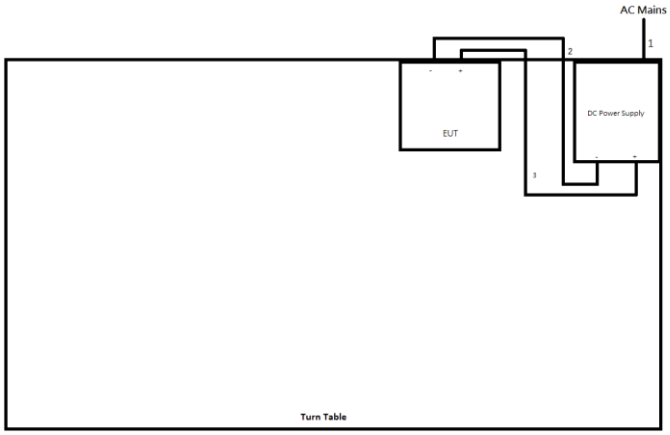
Support Equipment – RF Conducted				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
1	Notebook	HP	-	-
2	Adapter for NB	HP	-	-
3	DC Power Supply	GW	GPS-3030DD	-
4	Fixture	-	-	-

Note: Support equipment No.1, No.2 and No.4 were provided by customer.

Support Equipment – Radiated Emission				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
1	DC Power Supply	GW	GPR-3510HD	-

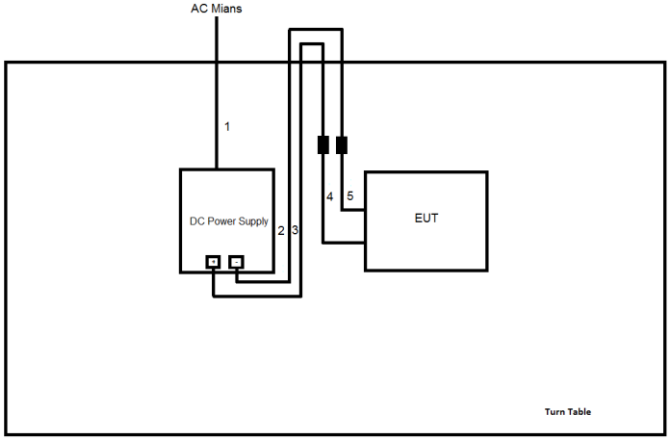
2.5 Test Setup Diagram

Test Setup Diagram – AC Line Conducted Emission Test



Item	Connection	Shielded	Length(m)	Remark
1	AC Power Cable	No	1.8	-
2	DC Power Cable	No	1.0	-
3	DC Power Cable	No	1.0	-

Test Setup Diagram - Radiated Test



Item	Connection	Shielded	Length(m)	Remark
1	AC Power Cable	No	1.8	-
2	DC Power Cable	No	1.0	-
3	DC Power Cable	No	1.0	-
4	DC Power Cable	No	0.5	-
5	DC Power Cable	No	0.5	-

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

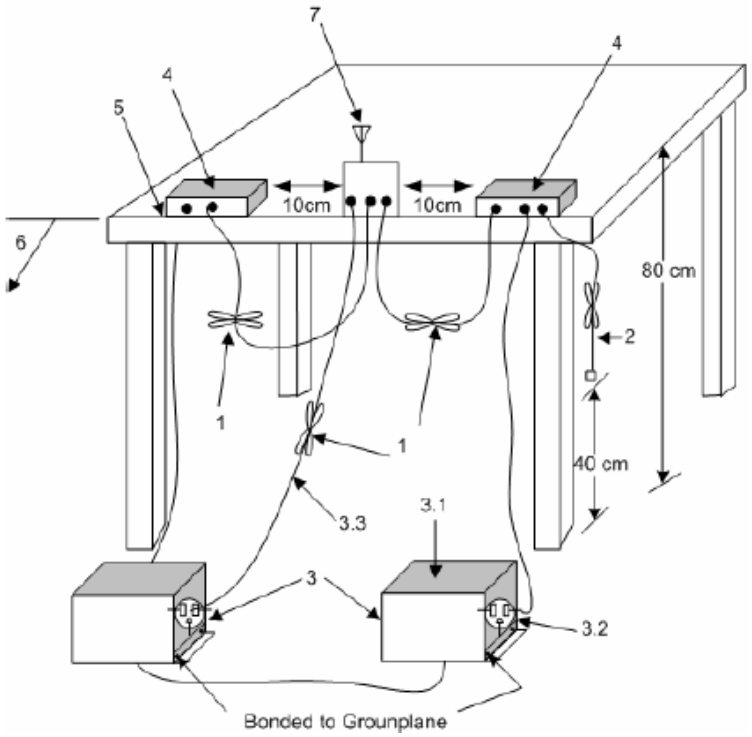
Refer a test equipment and calibration data table in this test report.

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



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

3.1.5 Test Result of AC Power-line Conducted Emissions

Refer as Appendix A

3.2 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

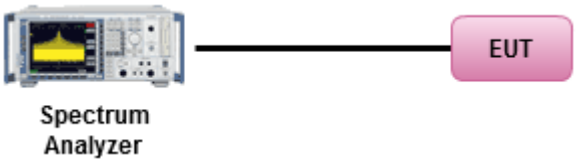
Refer a test equipment and calibration data table in this test report.

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 8.2 (11.8 of ANSI C63.10) DTS bandwidth measurement.
	☐ Refer as RSS-Gen, clause 6.7 for occupied bandwidth testing.
	☐ Refer as ANSI C63.10, clause 6.9.3 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} ≤ 6 dBi, then P_{Out} ≤ 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 + 8dB dBm
e.i.r.p. Power Limit:		
▪ 2400-2483.5 MHz Band		
	▪ Point-to-multipoint systems (P2M): P_{eirp} ≤ 36 dBm (4 W)	
	▪ Point-to-point systems (P2P): P_{eirp} ≤ MAX(36, [P_{Out} + G_{TX}]) dBm	
	▪ Smart antenna system (SAS)	
		- Single beam: P_{eirp} ≤ MAX(36, P_{Out} + G_{TX}) dBm
		- Overlap beam: P_{eirp} ≤ MAX(36, P_{Out} + G_{TX}) dBm
		- Aggregate power on all beams: P_{eirp} ≤ 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 8.3.1.1 (11.9.1.1 of ANSI C63.10) RBW ≥ EBW method.
	☐ Refer as KDB 558074, clause 8.3.1.2 (11.9.1.2 of ANSI C63.10) integrated band power method.
	☐ Refer as KDB 558074, clause 8.3.1.3 (11.9.1.3 of ANSI C63.10) peak power meter.
▪ Maximum Average Conducted Output Power	
	☐ Refer as KDB 558074, clause 8.3.2.2 (11.9.2.2 of ANSI C63.10) using a spectrum analyzer.
	☒ Refer as KDB 558074, clause 8.3.2.3 (11.9.2.3 of ANSI C63.10) using a 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

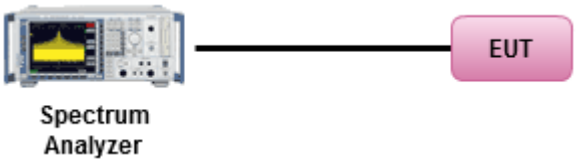
3.4.2 Measuring Instruments

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 8.4 (11.10 of ANSI C63.10) Method PKPSD.	
▪ 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
 Spectrum Analyzer

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 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 level.	

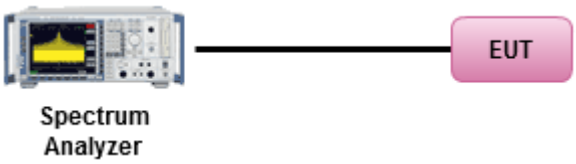
3.5.2 Measuring Instruments

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

3.5.3 Test Procedures

Test Method
▪ Refer as KDB 558074, clause 8.5 (11.11 of ANSI C63.10) for non-restricted frequency 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.

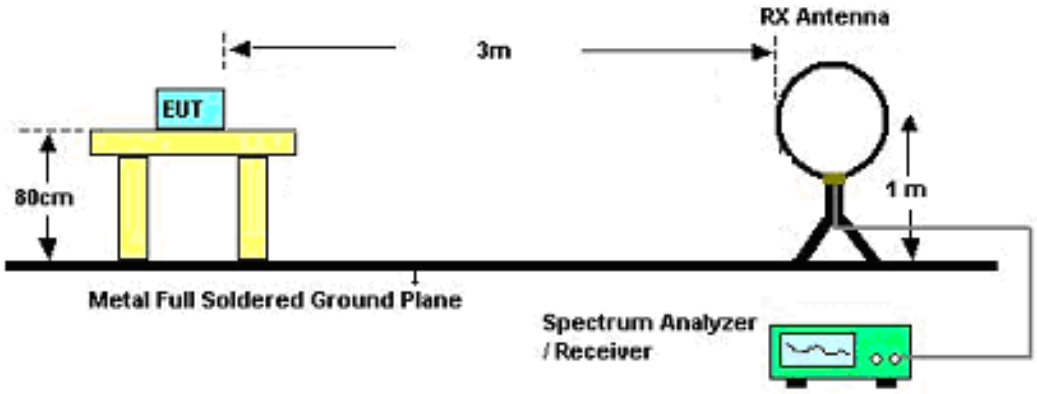
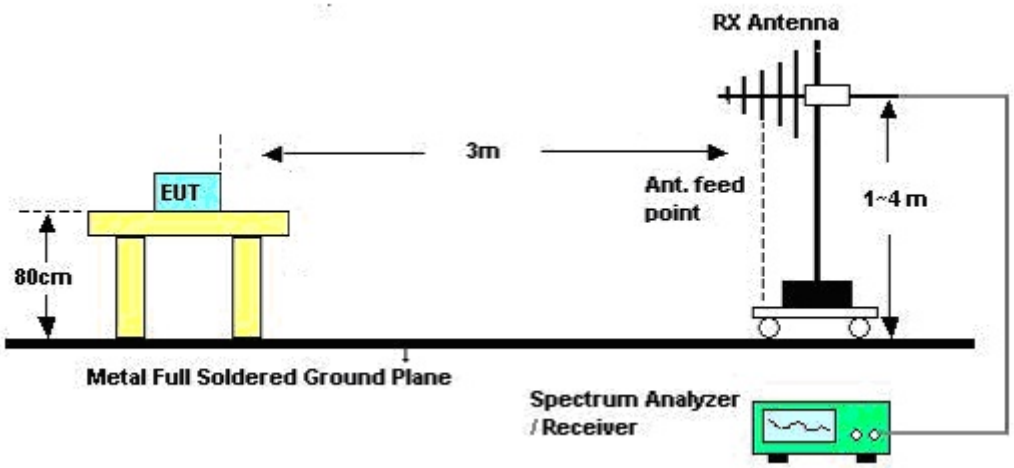
3.6.2 Measuring Instruments

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

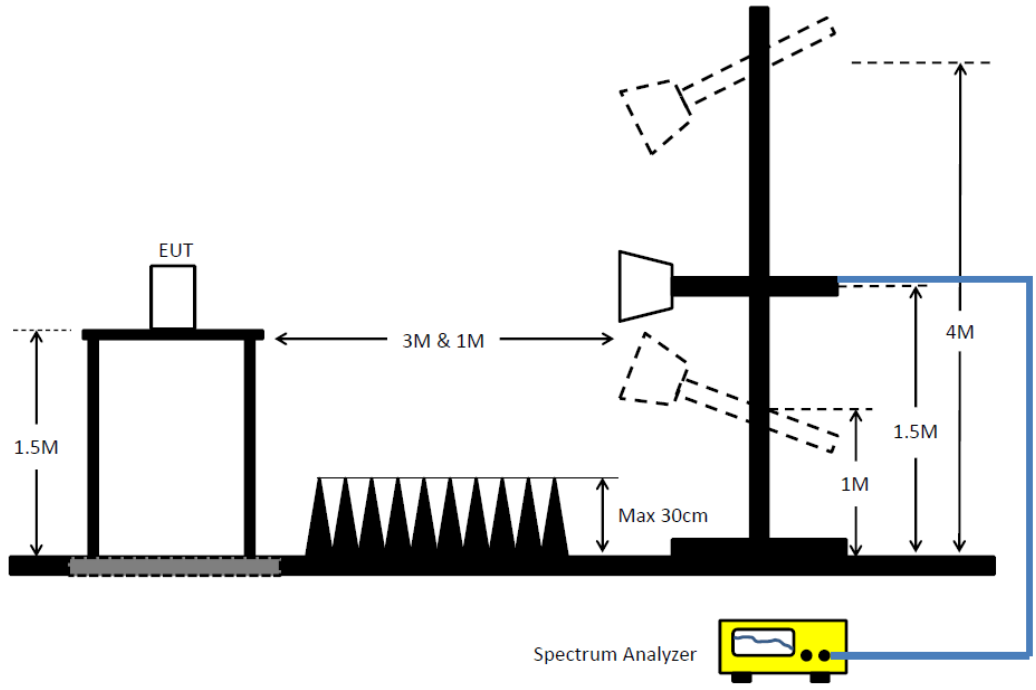
3.6.3 Test Procedures

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 8.6 (11.12 of ANSI C63.10) for restricted frequency bands.
▪ For the transmitter band-edge emissions shall be measured using following options below:	
	▪ Refer as KDB 558074 clause 8.7.1, 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 8.7.2 (6.10.6 of ANSI C63.10) for marker-delta method for band-edge measurements.
	▪ Refer as KDB 558074, clause 8.7.3 for narrower resolution bandwidth (100kHz) using the band power and summing the spectral levels.
▪ Use the following spectrum analyzer settings:	
	▪ Set RBW=100 kHz for f < 1 GHz; VBW=3 * RBW; Sweep = auto; Detector function = peak; Trace = max hold.
	▪ Set RBW = 1 MHz, VBW= 3MHz for f ≥ 1 GHz for peak measurement. For average measurement, refer as 1.1.4.
▪ KDB 414788 Open-Field Test Sites and Chamber Correlation Justification.	
	▪ Based on FCC 15.31 (f) (2): measurements may be performed at a distance closer than that specified in regulations; however, an attempt should be made to avoid making measurements in the near field.
	▪ Open-field site and chamber correlation testing had been performed and chamber measured test result is the worst case test result.

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

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	09/Apr/2019	08/Apr/2020
LISN	R&S	ENV216	101295	9kHz~30MHz	08/Nov/2018	07/Nov/2019
RF Cable-CON	MTJ	RG142	CB002-CO	9kHz~200MHz	12/Sep/2019	11/Sep/2020
AC POWER	APC	AFC-11005G	F310050055	47Hz~63Hz 5~300V	NCR	NCR
Impuls Begrenzer Pulse Limiter	SCHWARZBECK	VTSD 9561-F	9561-F041	9kHz~30MHz	24/Sep/2019	23/Sep/2020

NCR : Non-Calibration Require

Instrument for Radiated Test

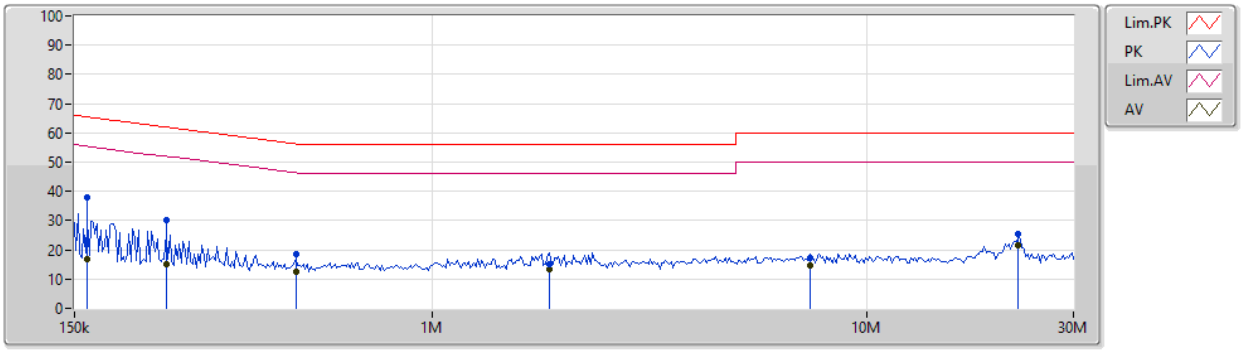
Instrument	Manufacturer	Model No.	Serial No.	Spec.	Calibration Date	Calibration Due Date
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	30MHz~1GHz 3m	30/ Aug/2019	29/ Aug/2020
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	1GHz~18GHz 3m	30/ Aug/2019	29/ Aug/2020
Amplifier	HP	8447D	2944A08033	10kHz~1.3GHz	22/Apr/2019	21/Apr/2020
EMI Test Receiver	R&S	ESR3	102052	9kHz~3.6GHz	09/Apr/2019	08/Apr/2020
Bilog Antenna & 5dB Attenuator	SCHAFFNER / MTJ	CBL 6112B / MTJ6102-05	2723 / 2	30MHz~2GHz	11/Oct/2019	10/Oct//2020
Microwave System Preamplifier	KEYSIGHT	83017A	MY53270196	1GHz~26.5GHz	09/Sep/2019	08/Sep/2020
Signal Analyzer	R&S	FSP40	100305	9kHz~40GHz; -140-+30dBm	10/Jun/2019	09/Jun/2020
RF Cable-R03m	Jye Bao	RG142	CB021	9kHz~1GHz	22/Mar/2019	21/Mar/2020
RF CABLE 6m	HUBER+SUHNER	SUOFLEX 104	SN 805801/4	1GHz~40GHz	21/Mar/2019	20/Mar/2020
RF CABLE	HUBER+SUHNER	SUOFLEX 104	802378/4	1GHz~18 GHz	04/Jul/2019	03/Jul/2020
Double Ridged Guide Horn Antenna	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1531	1GHz~18GHz	09/Mar/2019	08/Mar/2020
Broadband Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA 9170221	18GHz ~ 40GHz	22/Mar/2019	21/Mar/ 2020
Loop Antenna	TESEQ	HLA 6120	31244	9k~30MHz	15/Mar/2019	14/Mar/2020

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	13/Mar/2019	12/Mar/2020
Power Sensor	Anritsu	MA2411B	0917017	300MHz~40GHz	19/Feb/2019	18/Feb/2020
Power Meter	Anritsu	ML2495A	0949003	300MHz~40GHz	19/Feb/2019	18/Feb/2020
Cable 0.2m	HUBER	MY10710/4	RF Cable - 01	30MHz~18G	10/Jan/2019	09/Jan/2020
Cable 0.2m	HUBER	MY10711/4	RF Cable - 02	30MHz~18G	10/Jan/2019	09/Jan/2020
Cable 0.5m	HUBER	MY39470/4	RF Cable - 29	30MHz~18G	10/Jan/2019	09/Jan/2020
SMB100A Signal Generator	R&S	SMB100A03	181147	100kHz~40GHz	12/Nov/2018	10/Nov/2020

AC Power-line Conducted Emissions Result			
Operating Mode	1	**Power Phase**	Neutral
Operating Function	DC Power Supply mode		

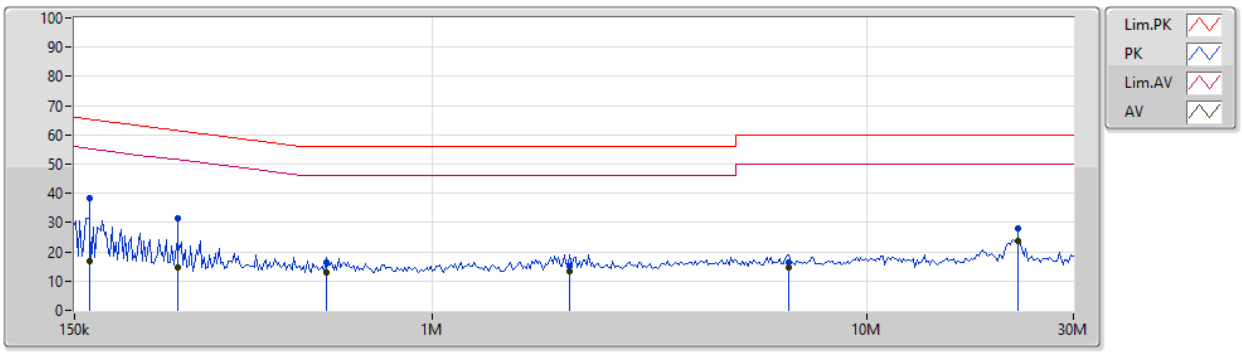
29/10/2019



Type	Freq	Level	Limit	Margin	Factor	Condition	Comment	Raw	LISN	CL	AT
	(Hz)	(dBuV)	(dBuV)	(dB)	(dB)			(dBuV)	(dB)	(dB)	(dB)
QP	160.82k	37.79	65.43	-27.64	19.58	Neutral	"Worst"	18.21	9.60	0.11	9.87
AV	160.82k	16.69	55.43	-38.74	19.58	Neutral	-	-2.89	9.60	0.11	9.87
QP	244.252k	30.25	61.95	-31.70	19.58	Neutral	-	10.67	9.59	0.12	9.87
AV	244.252k	14.97	51.95	-36.98	19.58	Neutral	-	-4.61	9.59	0.12	9.87
QP	485.303k	18.56	56.25	-37.69	19.60	Neutral	-	-1.04	9.59	0.13	9.88
AV	485.303k	12.32	46.25	-33.93	19.60	Neutral	-	-7.28	9.59	0.13	9.88
QP	1.86M	15.30	56.00	-40.70	19.64	Neutral	-	-4.34	9.61	0.14	9.89
AV	1.86M	13.40	46.00	-32.60	19.64	Neutral	-	-6.24	9.61	0.14	9.89
QP	7.414M	17.06	60.00	-42.94	19.78	Neutral	-	-2.72	9.65	0.24	9.89
AV	7.414M	14.77	50.00	-35.23	19.78	Neutral	-	-5.01	9.65	0.24	9.89
QP	22.374M	25.60	60.00	-34.40	19.97	Neutral	-	5.63	9.68	0.39	9.90
AV	22.374M	21.74	50.00	-28.26	19.97	Neutral	-	1.77	9.68	0.39	9.90

AC Power-line Conducted Emissions Result			
Operating Mode	1	**Power Phase**	Line
Operating Function	DC Power Supply mode		

29/10/2019



Type	Freq	Level	Limit	Margin	Factor	Condition	Comment	Raw	LISN	CL	AT
	(Hz)	(dBuV)	(dBuV)	(dB)	(dB)			(dBuV)	(dB)	(dB)	(dB)
QP	162.429k	38.26	65.33	-27.07	19.58	Line	-	18.68	9.60	0.11	9.87
AV	162.429k	16.92	55.33	-38.41	19.58	Line	-	-2.66	9.60	0.11	9.87
QP	259.279k	31.44	61.45	-30.01	19.59	Line	-	11.85	9.60	0.12	9.87
AV	259.279k	14.78	51.45	-36.67	19.59	Line	-	-4.81	9.60	0.12	9.87
QP	569.056k	16.21	56.00	-39.79	19.60	Line	-	-3.39	9.59	0.13	9.88
AV	569.056k	12.83	46.00	-33.17	19.60	Line	-	-6.77	9.59	0.13	9.88
QP	2.075M	15.24	56.00	-40.76	19.66	Line	-	-4.42	9.62	0.15	9.89
AV	2.075M	13.33	46.00	-32.67	19.66	Line	-	-6.33	9.62	0.15	9.89
QP	6.646M	16.41	60.00	-43.59	19.77	Line	-	-3.36	9.65	0.23	9.89
AV	6.646M	14.60	50.00	-35.40	19.77	Line	-	-5.17	9.65	0.23	9.89
QP	22.374M	27.82	60.00	-32.18	19.90	Line	-	7.92	9.61	0.39	9.90
AV	22.374M	23.80	50.00	-26.20	19.90	Line	"Worst"	3.90	9.61	0.39	9.90

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)	716.25k	1.071M	1M07F1D	697.5k	1.047M

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

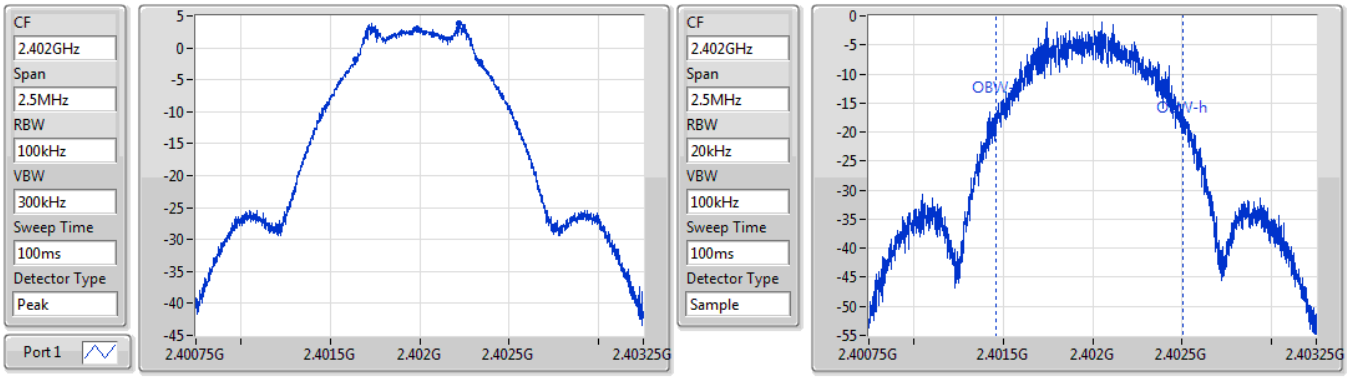
Mode	Result	Limit (Hz)	Port 1-N dB (Hz)	Port 1-OBW (Hz)
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	500k	697.5k	1.047M
2440MHz	Pass	500k	706.25k	1.062M
2480MHz	Pass	500k	716.25k	1.071M

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

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

2402MHz

29/10/2019

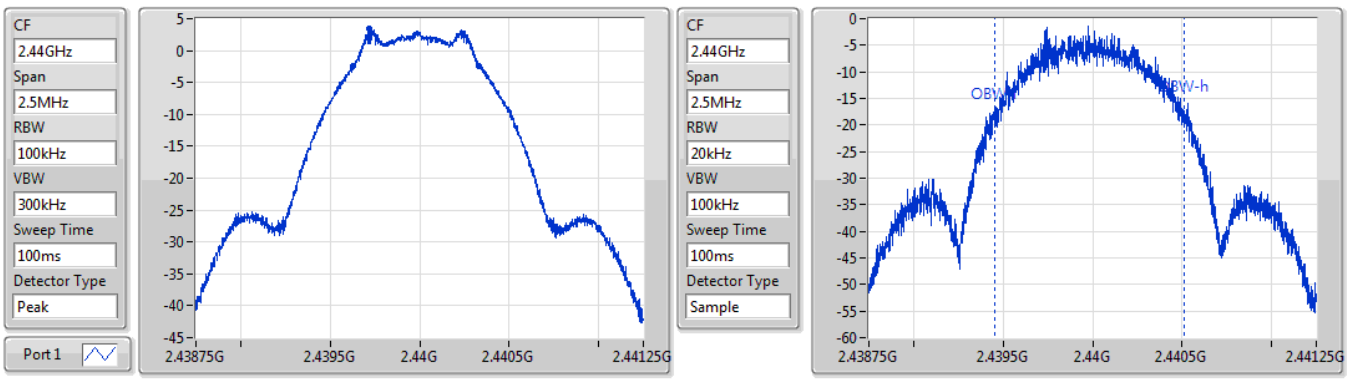


6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
697.5k	2.401639G	2.402336G	1.047M	2.40146G	2.402507G	500k	1

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

2440MHz

29/10/2019

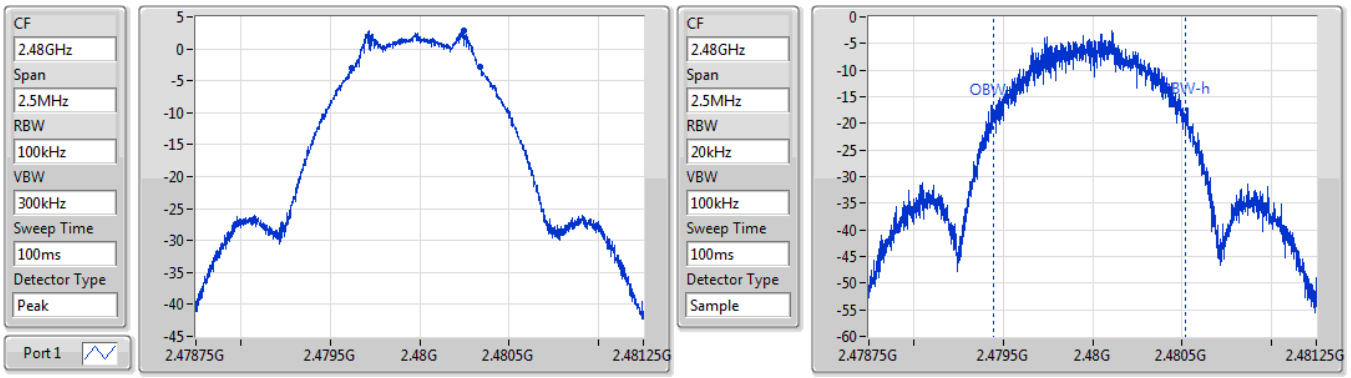


6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
706.25k	2.439628G	2.440334G	1.062M	2.439452G	2.440513G	500k	1

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

2480MHz

29/10/2019



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
716.25k	2.479624G	2.48034G	1.071M	2.479447G	2.480517G	500k	1

Summary

Mode	Power (dBm)	Power (W)
2.4-2.4835GHz	-	-
BT-LE(1Mbps)	4.27	0.00267

Result

Mode	Result	Gain (dBi)	Power (dBm)	Power Limit (dBm)
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	5.21	4.27	30.00
2440MHz	Pass	5.21	3.85	30.00
2480MHz	Pass	5.21	3.24	30.00

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

Summary

Mode	PD (dBm/RBW)
2.4-2.4835GHz	-
BT-LE(1Mbps)	-10.00

RBW=3 kHz.

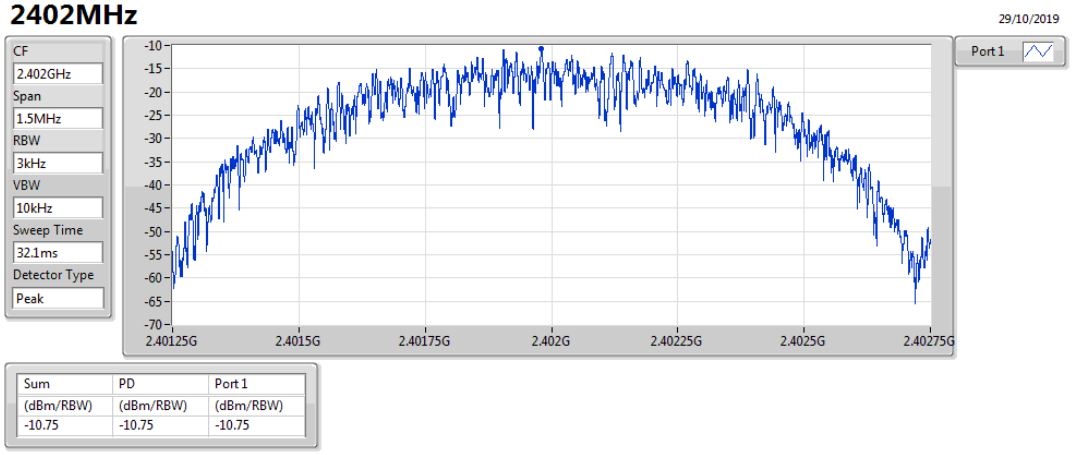
Result

Mode	Result	Gain (dBi)	PD (dBm/RBW)	PD Limit (dBm/RBW)
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	5.21	-10.75	8.00
2440MHz	Pass	5.21	-10.00	8.00
2480MHz	Pass	5.21	-12.64	8.00

DG = Directional Gain; RBW=3 kHz;
PD = trace bin-by-bin of each transmits port summing can be performed maximum power density; **Port X** = Port X power density;

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

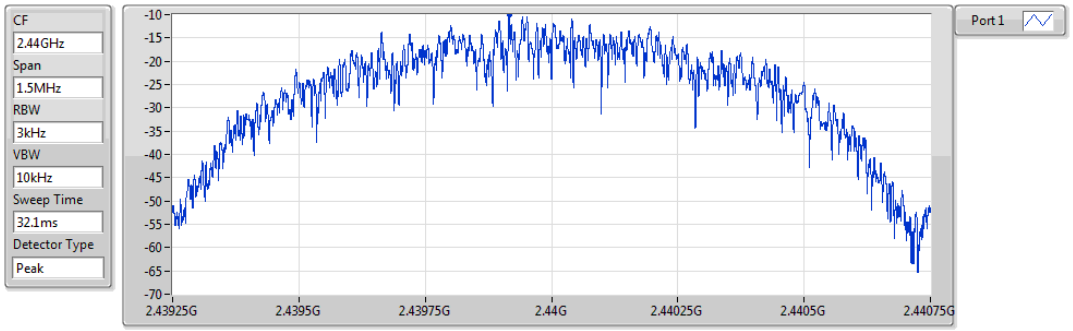
2402MHz



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-10.75	-10.75	-10.75

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

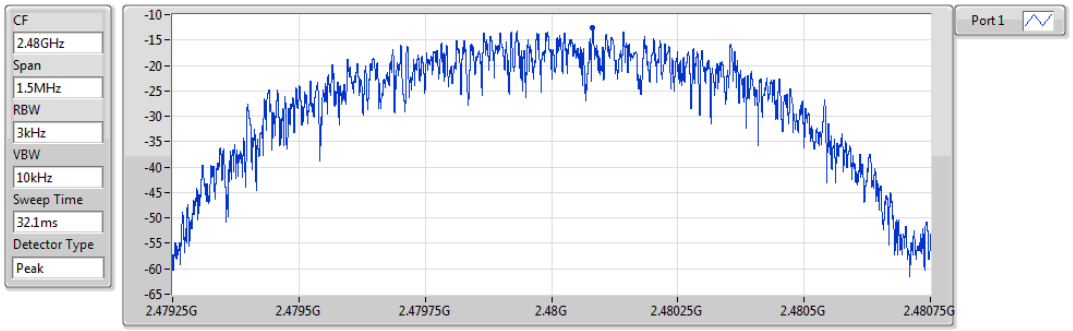
2440MHz



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-10.00	-10.00	-10.00

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

2480MHz



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-12.64	-12.64	-12.64

Summary

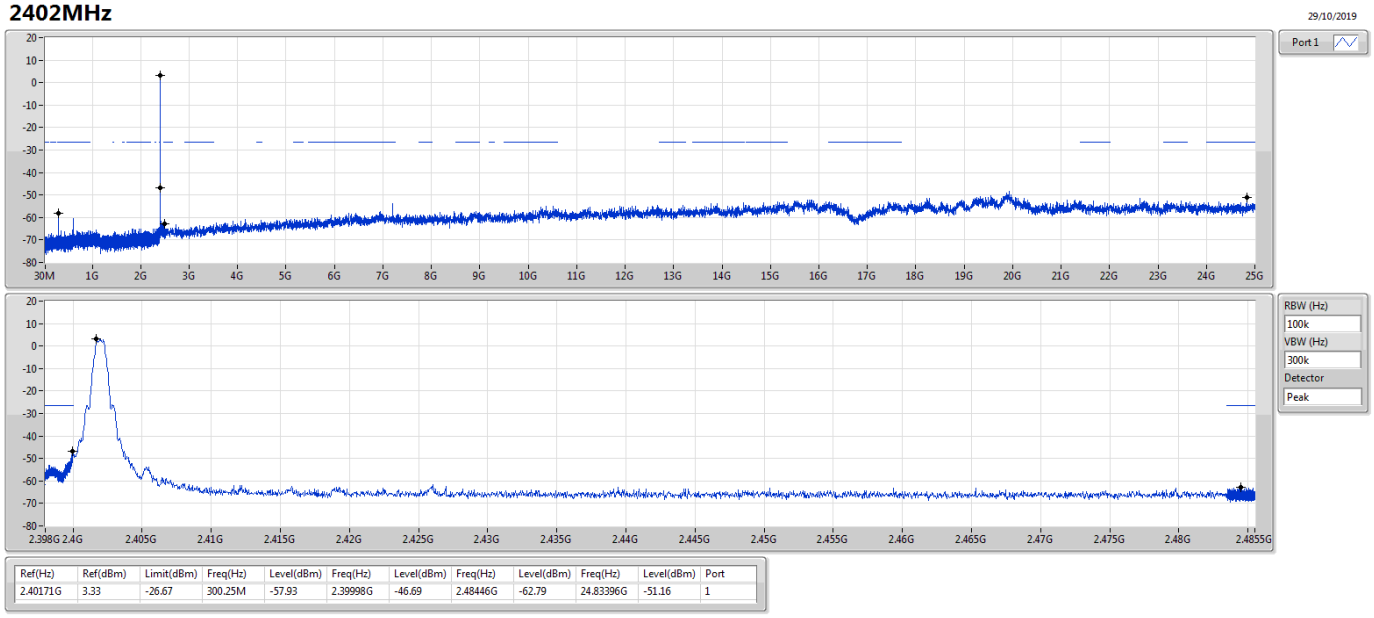
Mode	Result	Ref (Hz)	Ref (dBm)	Limit (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Port
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-	-	-
BT-LE(1Mbps)	Pass	2.40171G	3.33	-26.67	300.25M	-57.93	2.39998G	-46.69	2.48446G	-62.79	24.83396G	-51.16	1

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	Pass	2.40171G	3.33	-26.67	300.25M	-57.93	2.39998G	-46.69	2.48446G	-62.79	24.83396G	-51.16	1
2440MHz	Pass	2.40171G	3.33	-26.67	304.98M	-57.93	2.39969G	-62.10	2.48441G	-61.68	15.012G	-52.34	1
2480MHz	Pass	2.40171G	3.33	-26.67	310.02M	-57.48	2.39949G	-63.29	2.48352G	-56.81	21.80013G	-52.15	1

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

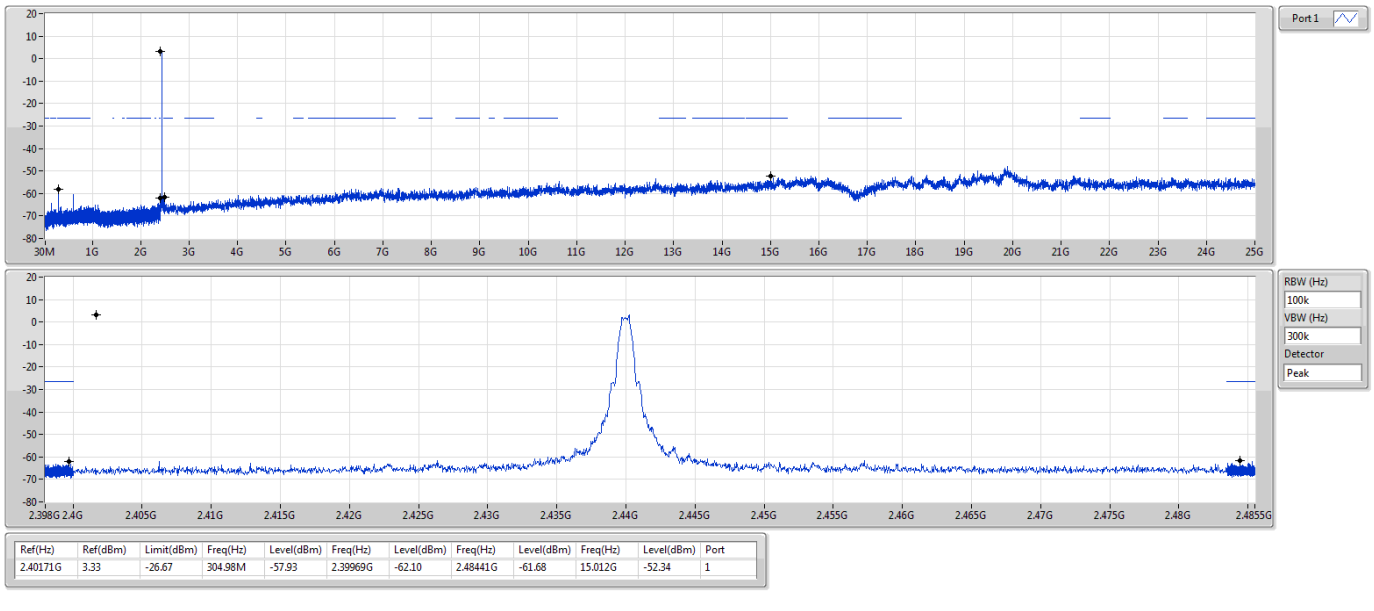
2402MHz



Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.40171G	3.33	-26.67	300.25M	-57.93	2.39998G	-46.69	2.48446G	-62.79	24.83396G	-51.16	1

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

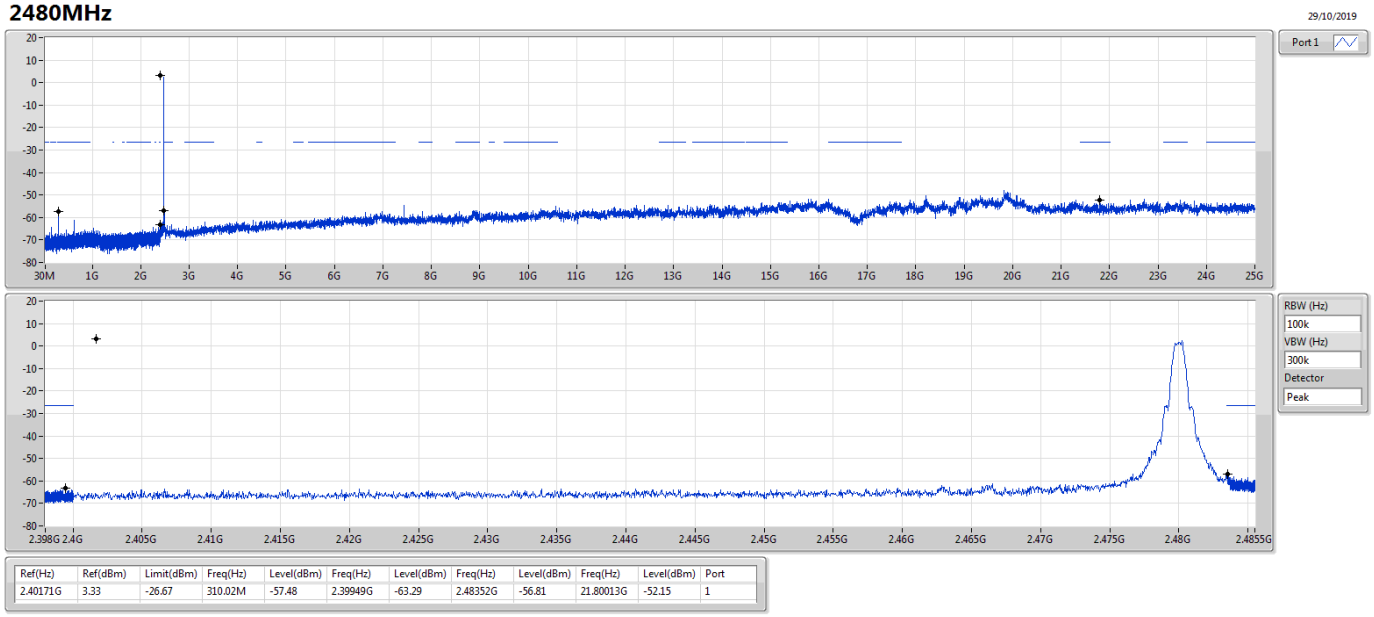
2440MHz



Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.40171G	3.33	-26.67	304.98M	-57.93	2.39969G	-62.10	2.48441G	-61.68	15.012G	-52.34	1

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

2480MHz



Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.40171G	3.33	-26.67	310.02M	-57.48	2.39949G	-63.29	2.48352G	-56.81	21.80013G	-52.15	1

Summary

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-
BT-LE(1Mbps)	Pass	PK	47.46M	30.88	40.00	-9.12	3	Vertical	360	1.00	-

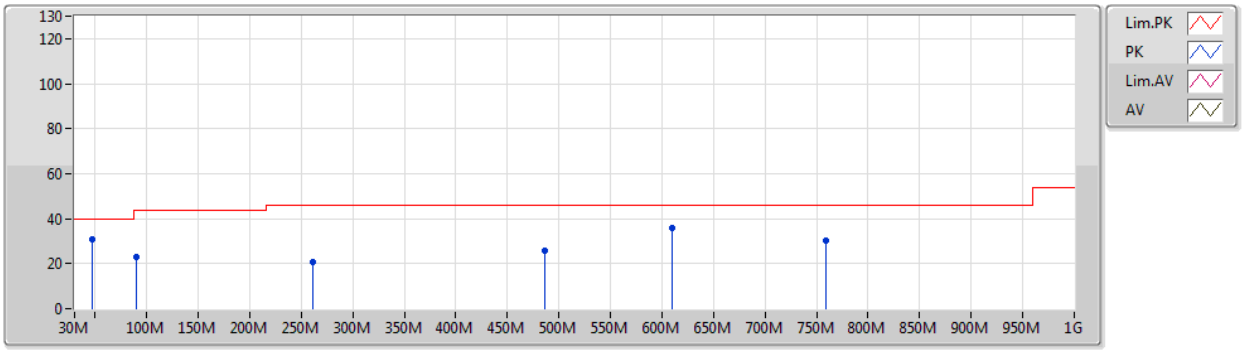
Result

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
BT-LE(1Mbps)	-	-	-	-	-	-	-	-	-	-	-
2440MHz_DC Power supply	Pass	PK	47.46M	30.88	40.00	-9.12	3	Vertical	360	1.00	-
2440MHz_DC Power supply	Pass	PK	90.14M	22.81	43.50	-20.69	3	Vertical	360	1.00	-
2440MHz_DC Power supply	Pass	PK	260.86M	20.95	46.00	-25.05	3	Vertical	360	1.00	-
2440MHz_DC Power supply	Pass	PK	485.9M	25.87	46.00	-20.13	3	Vertical	360	1.00	-
2440MHz_DC Power supply	Pass	PK	610.06M	35.61	46.00	-10.39	3	Vertical	360	1.00	-
2440MHz_DC Power supply	Pass	PK	759.44M	30.26	46.00	-15.74	3	Vertical	360	1.00	-
2440MHz_DC Power supply	Pass	PK	31.94M	27.24	40.00	-12.76	3	Horizontal	0	1.00	-
2440MHz_DC Power supply	Pass	PK	47.46M	25.98	40.00	-14.02	3	Horizontal	0	1.00	-
2440MHz_DC Power supply	Pass	PK	256.98M	21.61	46.00	-24.39	3	Horizontal	0	1.00	-
2440MHz_DC Power supply	Pass	PK	456.8M	29.21	46.00	-16.79	3	Horizontal	0	1.00	-
2440MHz_DC Power supply	Pass	PK	610.06M	31.97	46.00	-14.03	3	Horizontal	0	1.00	-
2440MHz_DC Power supply	Pass	PK	747.8M	32.10	46.00	-13.90	3	Horizontal	0	1.00	-

BT-LE(1Mbps)

30/10/2019

2440MHz_DC Power supply

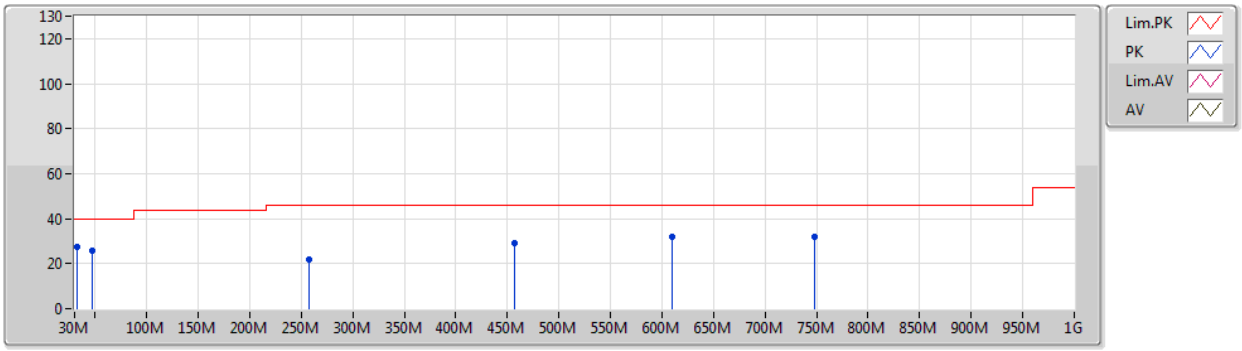


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
PK	47.46M	30.88	40.00	-9.12	-12.39	3	Vertical	360	1.00	-	43.27	14.11	1.02	27.52
PK	90.14M	22.81	43.50	-20.69	-12.14	3	Vertical	360	1.00	-	34.95	13.84	1.43	27.41
PK	260.86M	20.95	46.00	-25.05	-5.53	3	Vertical	360	1.00	-	26.48	18.66	2.54	26.73
PK	485.9M	25.87	46.00	-20.13	-1.58	3	Vertical	360	1.00	-	27.45	22.66	3.55	27.79
PK	610.06M	35.61	46.00	-10.39	0.02	3	Vertical	360	1.00	-	35.59	23.98	4.10	28.06
PK	759.44M	30.26	46.00	-15.74	1.55	3	Vertical	360	1.00	-	28.71	24.99	4.56	28.00

BT-LE(1Mbps)

30/10/2019

2440MHz_DC Power supply



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
PK	31.94M	27.24	40.00	-12.76	-4.84	3	Horizontal	0	1.00	-	32.08	21.90	0.83	27.57
PK	47.46M	25.98	40.00	-14.02	-12.39	3	Horizontal	0	1.00	-	38.37	14.11	1.02	27.52
PK	256.98M	21.61	46.00	-24.39	-5.87	3	Horizontal	0	1.00	-	27.48	18.35	2.51	26.73
PK	456.8M	29.21	46.00	-16.79	-2.20	3	Horizontal	0	1.00	-	31.41	22.09	3.42	27.71
PK	610.06M	31.97	46.00	-14.03	0.02	3	Horizontal	0	1.00	-	31.95	23.98	4.10	28.06
PK	747.8M	32.10	46.00	-13.90	1.35	3	Horizontal	0	1.00	-	30.75	24.89	4.50	28.04

Summary

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-
BT-LE(1Mbps)	Pass	AV	7.43916G	50.92	54.00	-3.08	3	Vertical	151	1.50	-

Result

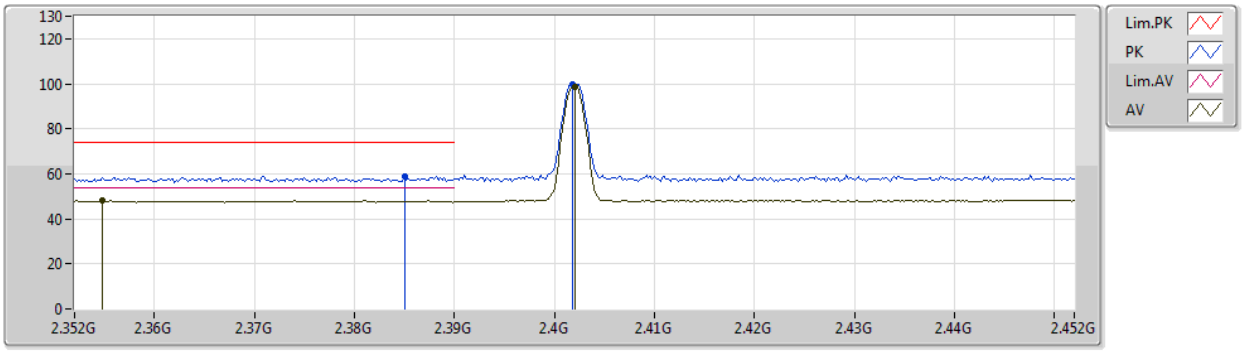
Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
BT-LE(1Mbps)	-	-	-	-	-	-	-	-	-	-	-
2402MHz_TX	Pass	AV	2.3548G	48.44	54.00	-5.56	3	Vertical	0	2.46	-
2402MHz_TX	Pass	AV	2.402G	98.80	Inf	-Inf	3	Vertical	0	2.46	-
2402MHz_TX	Pass	PK	2.385G	59.04	74.00	-14.96	3	Vertical	0	2.46	-
2402MHz_TX	Pass	PK	2.4018G	99.63	Inf	-Inf	3	Vertical	0	2.46	-
2402MHz_TX	Pass	AV	2.386G	48.17	54.00	-5.83	3	Horizontal	0	1.40	-
2402MHz_TX	Pass	AV	2.402G	104.18	Inf	-Inf	3	Horizontal	0	1.40	-
2402MHz_TX	Pass	PK	2.3748G	59.37	74.00	-14.63	3	Horizontal	0	1.40	-
2402MHz_TX	Pass	PK	2.4018G	105.00	Inf	-Inf	3	Horizontal	0	1.40	-
2402MHz_TX	Pass	AV	4.80344G	43.20	54.00	-10.80	3	Vertical	158	1.37	-
2402MHz_TX	Pass	PK	4.8036G	49.63	74.00	-24.37	3	Vertical	158	1.37	-
2402MHz_TX	Pass	AV	4.80356G	45.31	54.00	-8.69	3	Horizontal	30	1.22	-
2402MHz_TX	Pass	PK	4.80376G	50.96	74.00	-23.04	3	Horizontal	30	1.22	-
2440MHz_TX	Pass	AV	2.3792G	48.15	54.00	-5.85	3	Vertical	0	1.80	-
2440MHz_TX	Pass	AV	2.44G	91.64	Inf	-Inf	3	Vertical	0	1.80	-
2440MHz_TX	Pass	AV	2.4852G	48.52	54.00	-5.48	3	Vertical	0	1.80	-
2440MHz_TX	Pass	PK	2.3412G	58.87	74.00	-15.13	3	Vertical	0	1.80	-
2440MHz_TX	Pass	PK	2.4396G	92.60	Inf	-Inf	3	Vertical	0	1.80	-
2440MHz_TX	Pass	PK	2.4936G	59.35	74.00	-14.65	3	Vertical	0	1.80	-
2440MHz_TX	Pass	AV	2.3456G	48.05	54.00	-5.95	3	Horizontal	360	1.86	-
2440MHz_TX	Pass	AV	2.44G	102.20	Inf	-Inf	3	Horizontal	360	1.86	-
2440MHz_TX	Pass	AV	2.4956G	48.77	54.00	-5.23	3	Horizontal	360	1.86	-
2440MHz_TX	Pass	PK	2.382G	59.31	74.00	-14.69	3	Horizontal	360	1.86	-
2440MHz_TX	Pass	PK	2.4396G	103.05	Inf	-Inf	3	Horizontal	360	1.86	-
2440MHz_TX	Pass	PK	2.4932G	58.82	74.00	-15.18	3	Horizontal	360	1.86	-
2440MHz_TX	Pass	AV	4.87952G	42.85	54.00	-11.15	3	Vertical	158	1.38	-
2440MHz_TX	Pass	AV	7.3191G	49.92	54.00	-4.08	3	Vertical	147	1.48	-
2440MHz_TX	Pass	PK	4.88048G	50.19	74.00	-23.81	3	Vertical	158	1.38	-
2440MHz_TX	Pass	PK	7.31922G	56.91	74.00	-17.09	3	Vertical	147	1.48	-
2440MHz_TX	Pass	AV	4.87952G	45.45	54.00	-8.55	3	Horizontal	31	1.72	-
2440MHz_TX	Pass	AV	7.31916G	47.42	54.00	-6.58	3	Horizontal	308	1.03	-
2440MHz_TX	Pass	PK	4.87946G	51.67	74.00	-22.33	3	Horizontal	31	1.72	-
2440MHz_TX	Pass	PK	7.32048G	55.77	74.00	-18.23	3	Horizontal	308	1.03	-
2480MHz_TX	Pass	AV	2.48G	96.55	Inf	-Inf	3	Vertical	0	1.66	-
2480MHz_TX	Pass	AV	2.4836G	48.76	54.00	-5.24	3	Vertical	0	1.66	-
2480MHz_TX	Pass	PK	2.4798G	97.43	Inf	-Inf	3	Vertical	0	1.66	-
2480MHz_TX	Pass	PK	2.4992G	59.64	74.00	-14.36	3	Vertical	0	1.66	-
2480MHz_TX	Pass	AV	2.48G	102.66	Inf	-Inf	3	Horizontal	0	1.40	-
2480MHz_TX	Pass	AV	2.4858G	49.02	54.00	-4.98	3	Horizontal	0	1.40	-
2480MHz_TX	Pass	PK	2.4802G	103.46	Inf	-Inf	3	Horizontal	0	1.40	-
2480MHz_TX	Pass	PK	2.4848G	59.79	74.00	-14.21	3	Horizontal	0	1.40	-
2480MHz_TX	Pass	AV	4.95946G	46.30	54.00	-7.70	3	Vertical	141	1.89	-
2480MHz_TX	Pass	AV	7.43916G	50.92	54.00	-3.08	3	Vertical	151	1.50	-
2480MHz_TX	Pass	PK	4.9606G	52.04	74.00	-21.96	3	Vertical	141	1.89	-
2480MHz_TX	Pass	PK	7.44042G	57.75	74.00	-16.25	3	Vertical	151	1.50	-
2480MHz_TX	Pass	AV	4.95958G	48.87	54.00	-5.13	3	Horizontal	31	1.90	-
2480MHz_TX	Pass	AV	7.4394G	50.05	54.00	-3.95	3	Horizontal	309	1.14	-
2480MHz_TX	Pass	PK	4.95952G	53.18	74.00	-20.82	3	Horizontal	31	1.90	-

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
2480MHz_TX	Pass	PK	7.43916G	56.13	74.00	-17.87	3	Horizontal	309	1.14	-

BT-LE(1Mbps)

2402MHz_TX

30/10/2019

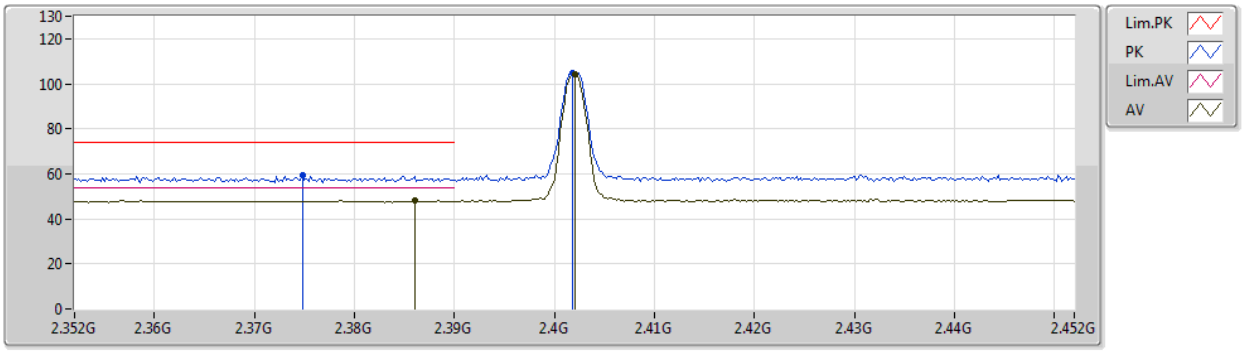


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
AV	2.3548G	48.44	54.00	-5.56	31.64	3	Vertical	0	2.46	-	16.80	27.68	3.96	-
AV	2.402G	98.80	Inf	-Inf	31.51	3	Vertical	0	2.46	-	67.29	27.50	4.01	-
PK	2.385G	59.04	74.00	-14.96	31.55	3	Vertical	0	2.46	-	27.49	27.56	3.99	-
PK	2.4018G	99.63	Inf	-Inf	31.51	3	Vertical	0	2.46	-	68.12	27.50	4.01	-

BT-LE(1Mbps)

2402MHz_TX

30/10/2019

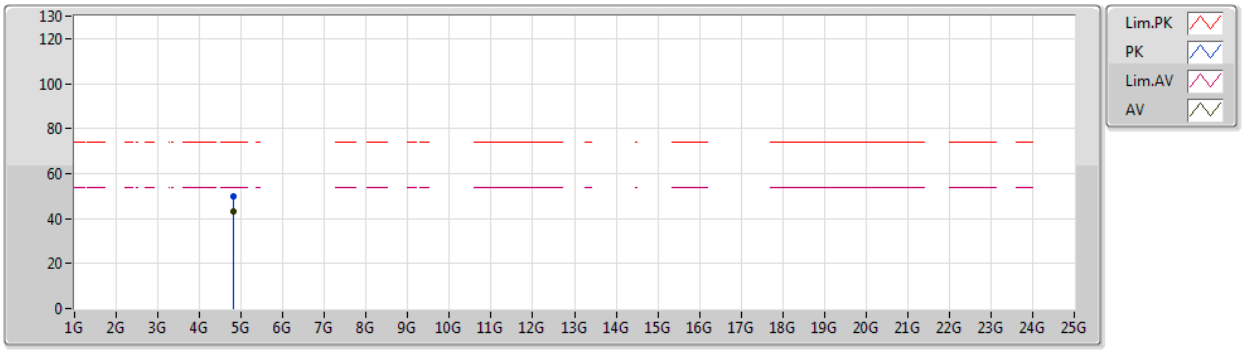


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
AV	2.386G	48.17	54.00	-5.83	31.55	3	Horizontal	0	1.40	-	16.62	27.56	3.99	-
AV	2.402G	104.18	Inf	-Inf	31.51	3	Horizontal	0	1.40	-	72.67	27.50	4.01	-
PK	2.3748G	59.37	74.00	-14.63	31.58	3	Horizontal	0	1.40	-	27.79	27.60	3.98	-
PK	2.4018G	105.00	Inf	-Inf	31.51	3	Horizontal	0	1.40	-	73.49	27.50	4.01	-

BT-LE(1Mbps)

2402MHz_TX

30/10/2019

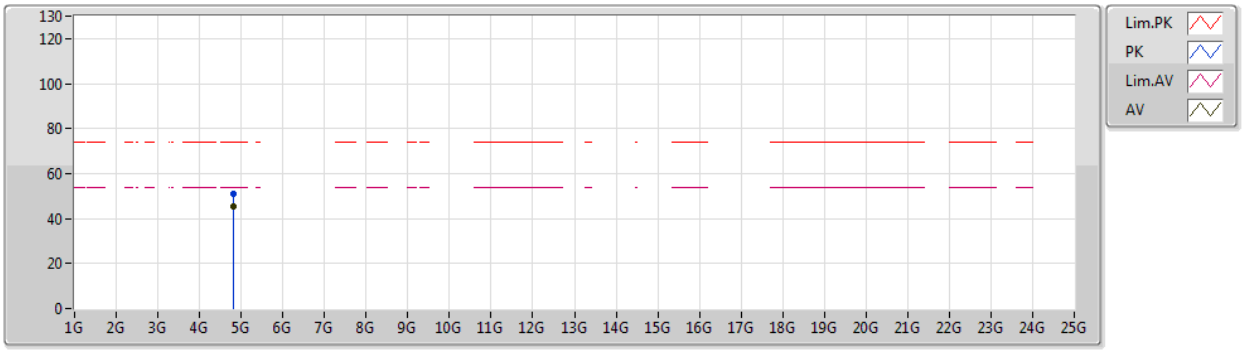


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
AV	4.80344G	43.20	54.00	-10.80	7.47	3	Vertical	158	1.37	-	35.73	31.10	5.78	29.41
PK	4.8036G	49.63	74.00	-24.37	7.47	3	Vertical	158	1.37	-	42.16	31.10	5.78	29.41

BT-LE(1Mbps)

2402MHz_TX

30/10/2019

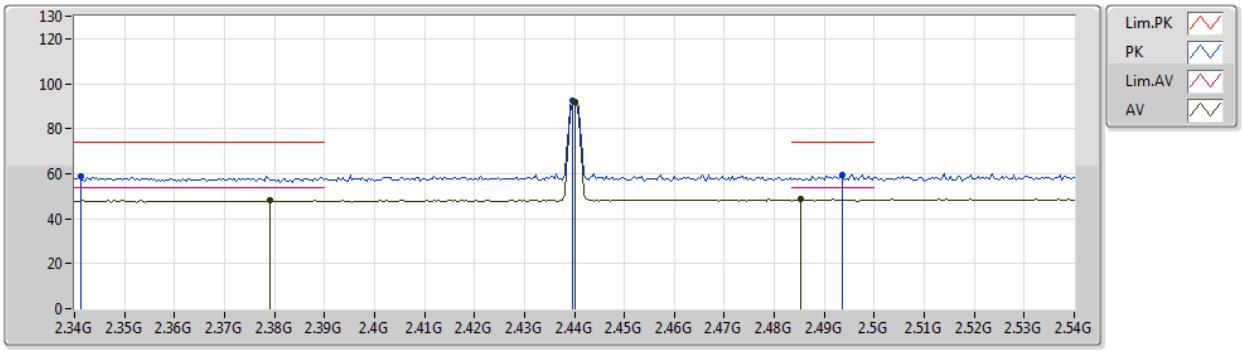


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
AV	4.80356G	45.31	54.00	-8.69	7.47	3	Horizontal	30	1.22	-	37.84	31.10	5.78	29.41
PK	4.80376G	50.96	74.00	-23.04	7.47	3	Horizontal	30	1.22	-	43.49	31.10	5.78	29.41

BT-LE(1Mbps)

2440MHz_TX

30/10/2019

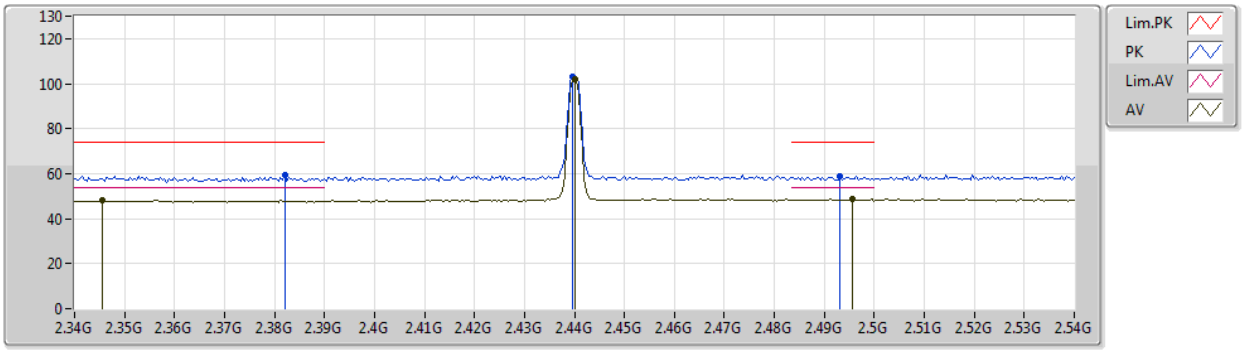


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
AV	2.3792G	48.15	54.00	-5.85	31.57	3	Vertical	0	1.80	-	16.58	27.58	3.99	-
AV	2.44G	91.64	Inf	-Inf	31.46	3	Vertical	0	1.80	-	60.18	27.42	4.04	-
AV	2.4852G	48.52	54.00	-5.48	31.42	3	Vertical	0	1.80	-	17.10	27.33	4.09	-
PK	2.3412G	58.87	74.00	-15.13	31.69	3	Vertical	0	1.80	-	27.18	27.74	3.95	-
PK	2.4396G	92.60	Inf	-Inf	31.46	3	Vertical	0	1.80	-	61.14	27.42	4.04	-
PK	2.4936G	59.35	74.00	-14.65	31.40	3	Vertical	0	1.80	-	27.95	27.31	4.09	-

BT-LE(1Mbps)

2440MHz_TX

30/10/2019

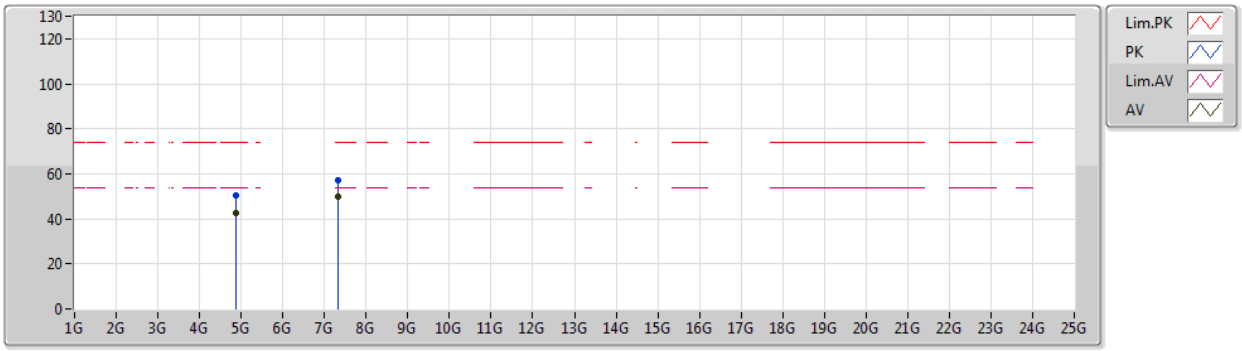


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
AV	2.3456G	48.05	54.00	-5.95	31.67	3	Horizontal	360	1.86	-	16.38	27.72	3.95	-
AV	2.44G	102.20	Inf	-Inf	31.46	3	Horizontal	360	1.86	-	70.74	27.42	4.04	-
AV	2.4956G	48.77	54.00	-5.23	31.41	3	Horizontal	360	1.86	-	17.36	27.31	4.10	-
PK	2.382G	59.31	74.00	-14.69	31.56	3	Horizontal	360	1.86	-	27.75	27.57	3.99	-
PK	2.4396G	103.05	Inf	-Inf	31.46	3	Horizontal	360	1.86	-	71.59	27.42	4.04	-
PK	2.4932G	58.82	74.00	-15.18	31.40	3	Horizontal	360	1.86	-	27.42	27.31	4.09	-

BT-LE(1Mbps)

2440MHz_TX

30/10/2019

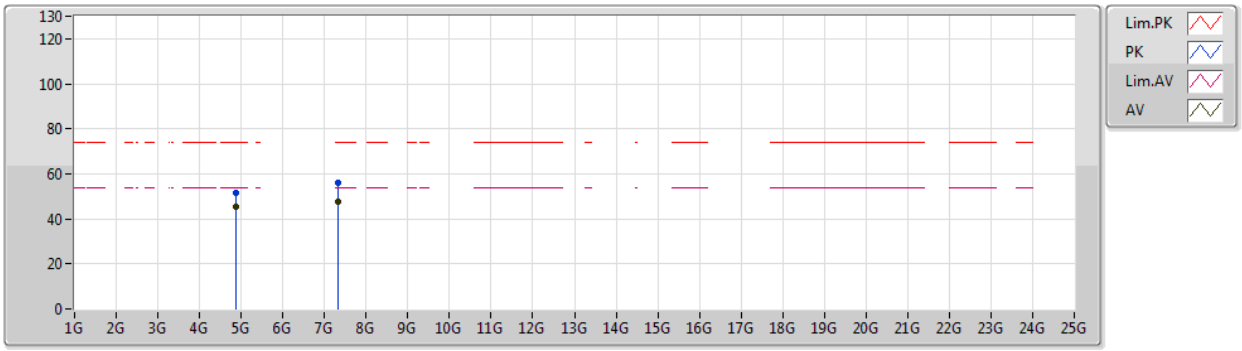


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
AV	4.87952G	42.85	54.00	-11.15	7.63	3	Vertical	158	1.38	-	35.22	31.18	5.83	29.38
AV	7.3191G	49.92	54.00	-4.08	13.38	3	Vertical	147	1.48	-	36.54	36.28	7.46	30.36
PK	4.88048G	50.19	74.00	-23.81	7.64	3	Vertical	158	1.38	-	42.55	31.18	5.83	29.37
PK	7.31922G	56.91	74.00	-17.09	13.38	3	Vertical	147	1.48	-	43.53	36.28	7.46	30.36

BT-LE(1Mbps)

2440MHz_TX

30/10/2019

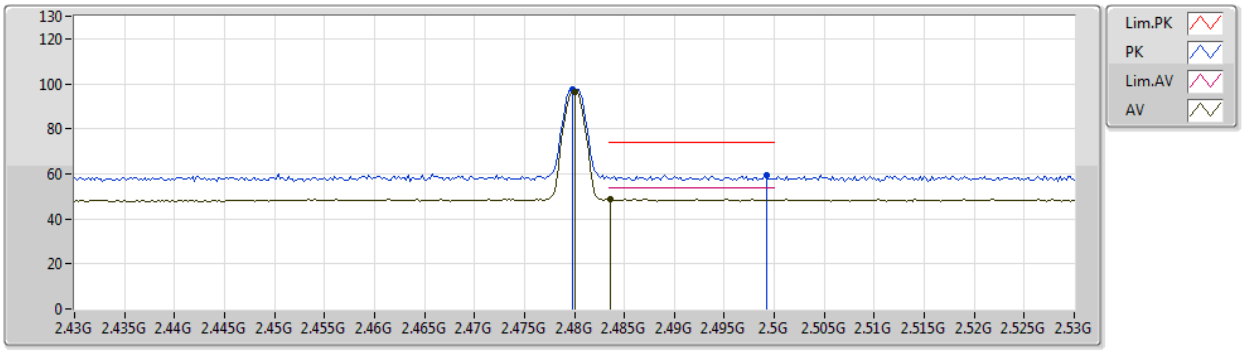


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
AV	4.87952G	45.45	54.00	-8.55	7.63	3	Horizontal	31	1.72	-	37.82	31.18	5.83	29.38
AV	7.31916G	47.42	54.00	-6.58	13.38	3	Horizontal	308	1.03	-	34.04	36.28	7.46	30.36
PK	4.87946G	51.67	74.00	-22.33	7.63	3	Horizontal	31	1.72	-	44.04	31.18	5.83	29.38
PK	7.32048G	55.77	74.00	-18.23	13.37	3	Horizontal	308	1.03	-	42.40	36.28	7.46	30.37

BT-LE(1Mbps)

2480MHz_TX

30/10/2019

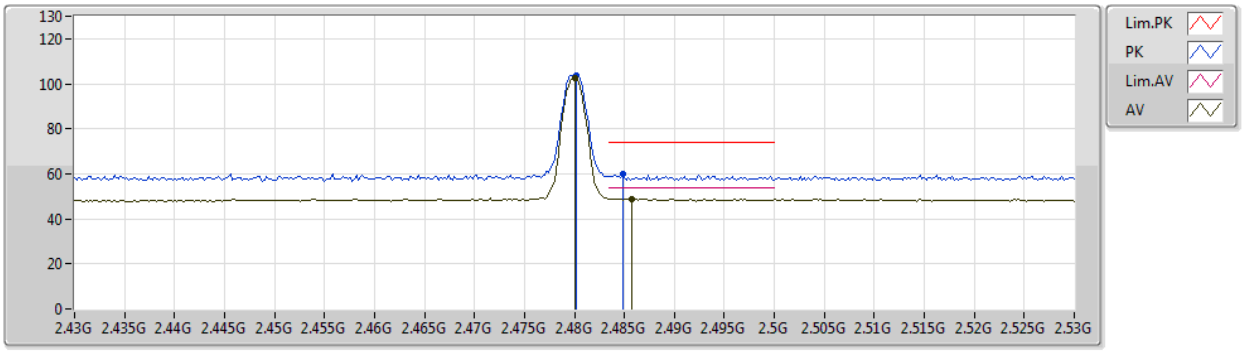


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
AV	2.48G	96.55	Inf	-Inf	31.42	3	Vertical	0	1.66	-	65.13	27.34	4.08	-
AV	2.4836G	48.76	54.00	-5.24	31.41	3	Vertical	0	1.66	-	17.35	27.33	4.08	-
PK	2.4798G	97.43	Inf	-Inf	31.42	3	Vertical	0	1.66	-	66.01	27.34	4.08	-
PK	2.4992G	59.64	74.00	-14.36	31.40	3	Vertical	0	1.66	-	28.24	27.30	4.10	-

BT-LE(1Mbps)

2480MHz_TX

30/10/2019

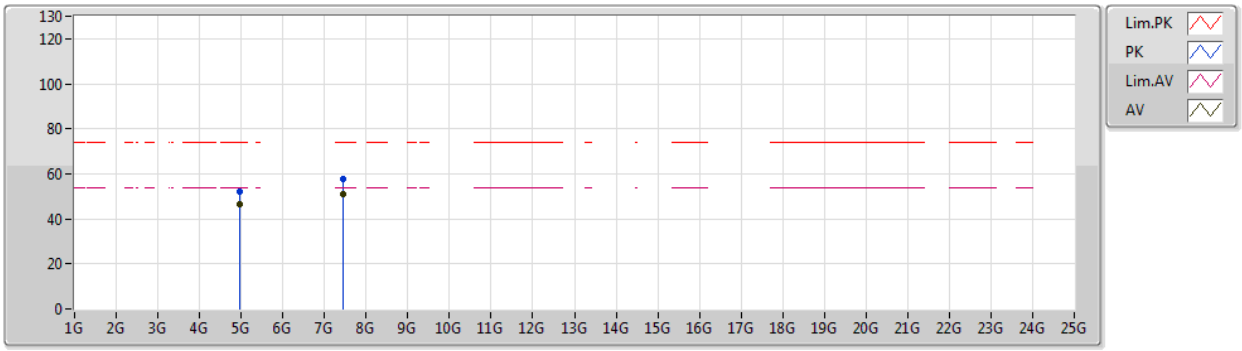


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
AV	2.48G	102.66	Inf	-Inf	31.42	3	Horizontal	0	1.40	-	71.24	27.34	4.08	-
AV	2.4858G	49.02	54.00	-4.98	31.42	3	Horizontal	0	1.40	-	17.60	27.33	4.09	-
PK	2.4802G	103.46	Inf	-Inf	31.42	3	Horizontal	0	1.40	-	72.04	27.34	4.08	-
PK	2.4848G	59.79	74.00	-14.21	31.42	3	Horizontal	0	1.40	-	28.37	27.33	4.09	-

BT-LE(1Mbps)

2480MHz_TX

30/10/2019

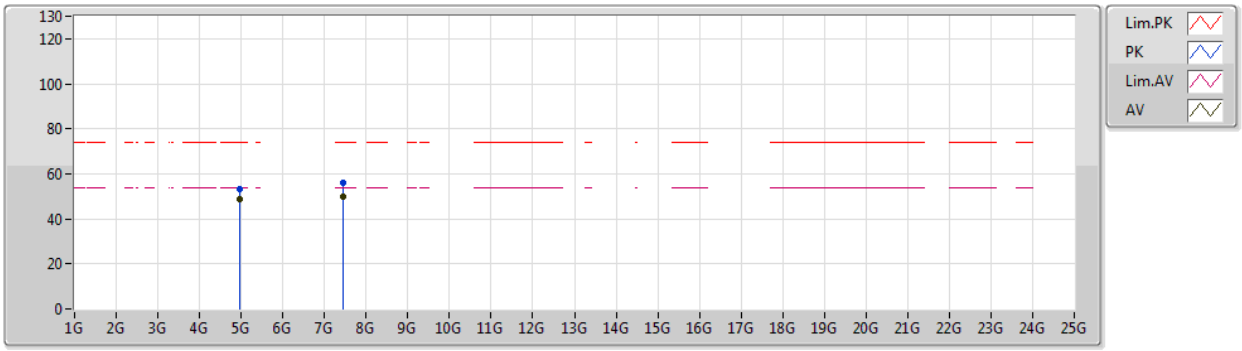


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
AV	4.95946G	46.30	54.00	-7.70	7.93	3	Vertical	141	1.89	-	38.37	31.38	5.89	29.34
AV	7.43916G	50.92	54.00	-3.08	13.01	3	Vertical	151	1.50	-	37.91	36.24	7.24	30.47
PK	4.9606G	52.04	74.00	-21.96	7.93	3	Vertical	141	1.89	-	44.11	31.38	5.89	29.34
PK	7.44042G	57.75	74.00	-16.25	13.01	3	Vertical	151	1.50	-	44.74	36.24	7.24	30.47

BT-LE(1Mbps)

2480MHz_TX

30/10/2019



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
AV	4.95958G	48.87	54.00	-5.13	7.93	3	Horizontal	31	1.90	-	40.94	31.38	5.89	29.34
AV	7.4394G	50.05	54.00	-3.95	13.01	3	Horizontal	309	1.14	-	37.04	36.24	7.24	30.47
PK	4.95952G	53.18	74.00	-20.82	7.93	3	Horizontal	31	1.90	-	45.25	31.38	5.89	29.34
PK	7.43916G	56.13	74.00	-17.87	13.01	3	Horizontal	309	1.14	-	43.12	36.24	7.24	30.47