

FCC Test Report

FCC ID : TTUBEOPLAYH95
Equipment : Bluetooth Headphone
Brand Name : Bang & Olufsen
Model Name : Beoplay H95
Applicant : Bang & Olufsen A/S
Bang og Olufsen Allé 1, 7600 Struer, Denmark
Manufacturer : Bang & Olufsen A/S
Bang og Olufsen Allé 1, 7600 Struer, Denmark
Standard : 47 CFR FCC Part 15.247

The product was received on Dec. 26, 2019, and testing was started from Jan. 17, 2020 and completed on Jan. 21, 2020. 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: Allen Lin

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

[illegible]

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	-

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: Ann Hou

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
2.4-2.4835GHz	BT-LE(2Mbps)	2.0	1TX

Note:

- ♦ Bluetooth LE uses a GFSK (1Mbps/2Mbps) modulation for DSSS.
- ♦ BWch is the nominal channel bandwidth.

1.1.2 Antenna Information

Ant.	Brand	Model Name	Antenna Type	Connector
1	DongGuan AEON TECH.,LTD	C4230-510001-A	FPC Antenn	N/A

Ant.	Port	Gain (dBi)
		BT
1	1	1.61

Note 1: The EUT has one antenna.

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	From Host system / Battery		
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) $\geq 1/T$
BT-LE(1Mbps)	0.636	1.97	397.5u	3k
BT-LE(2Mbps)	0.342	4.66	213.75u	10k

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.				
☐	Wen Shan	ADD : No.14-1, Ln. 19, Wen 33rd St., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)		
		TEL : 886-3-318-0787	FAX : 886-3-318-0287	
Test site Designation No. TW1097 with FCC.				

Test Condition	Test Site No.	Test Engineer	Test Environment	Test Date
AC Conduction	CO04-HY	Edward Wang	22.1~23.8°C / 44~48%	21/Jan/2020
RF Conducted	TH01-HY	Andy Lee	20.5~25.8°C / 62.5~65.9%	17/Jan/2020
Radiated	03CH02-HY	Daniel Lin	18.2~21.5°C / 46.7~54.2%	20/Jan/2020~ 21/Jan/2020

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	3.7V

2.2 Test Channel Mode

Test Software	N/A
---------------	-----

Mode	Power Setting
BT-LE(1Mbps)	-
2402MHz	default
2440MHz	default
2480MHz	default
BT-LE(2Mbps)	-
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
1	USB mode

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

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

2.4 Accessories and Support Equipment

Accessories				
Battery	Brand Name	Synergy	Model Name	AHB723938PCT
	Power Rating	3.7Vdc, 1110mAh	Type	Lithium-ion Polymer Battery Pack
USB Cable	Brand Name	Bang & Olufsen	Model Name	4021XW01855ZAU
	Signal Line	1.2 meter, D-shielded cable, w/o ferrite core		
Audio Cable	Brand Name	Bang & Olufsen	Model Name	4021XW01856ZAS
	Signal Line	1.2 meter, non-shielded cable, w/o ferrite core		

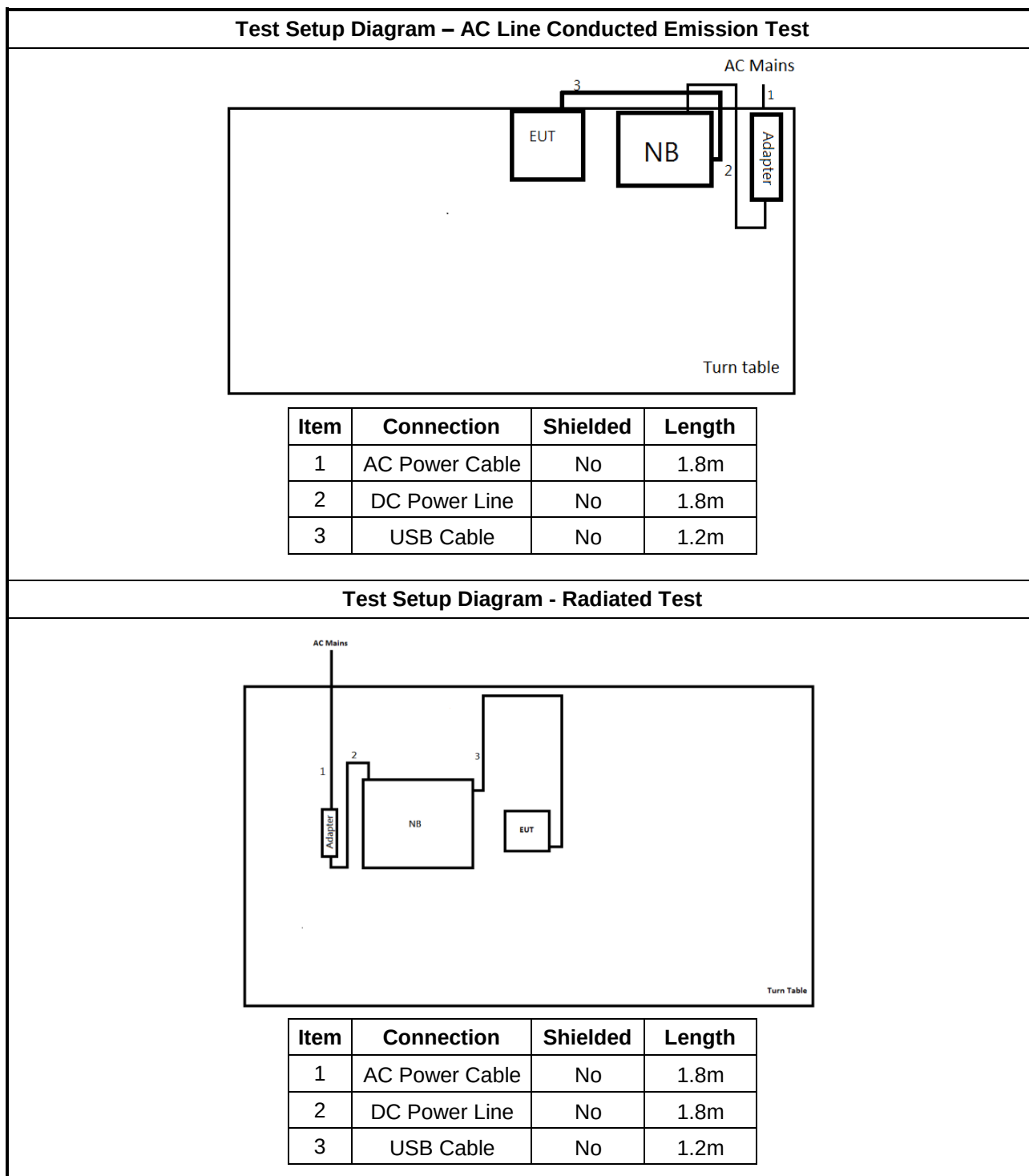
Reminder: Regarding to more detail and other information, please refer to user manual.

Support Equipment – AC Conduction				
No.	Equipment	Brand Name	Model Name	FCC ID
1	Notebook	ACER	ZQS	N/A
2	Adapter For Notebook	Lite ON	PA-1900-34	N/A

Support Equipment – RF Conducted				
No.	Equipment	Brand Name	Model Name	FCC ID
1	Notebook	ACER	ZQS	DoC
2	Adapter For Notebook	Lite ON	PA-1900-34	DoC
3	DC Power Supply	GW	GPS-3030DD	N/A

Support Equipment – Radiated Emission				
No.	Equipment	Brand Name	Model Name	FCC ID
1	Notebook	ACER	ZQS	N/A
2	Adapter For Notebook	Lite ON	PA-1900-34	N/A

2.5 Test Setup Diagram



3 Transmitter Test Result

3.1 AC Power-line Conducted Emissions

3.1.1 AC Power-line Conducted Emissions Limit

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

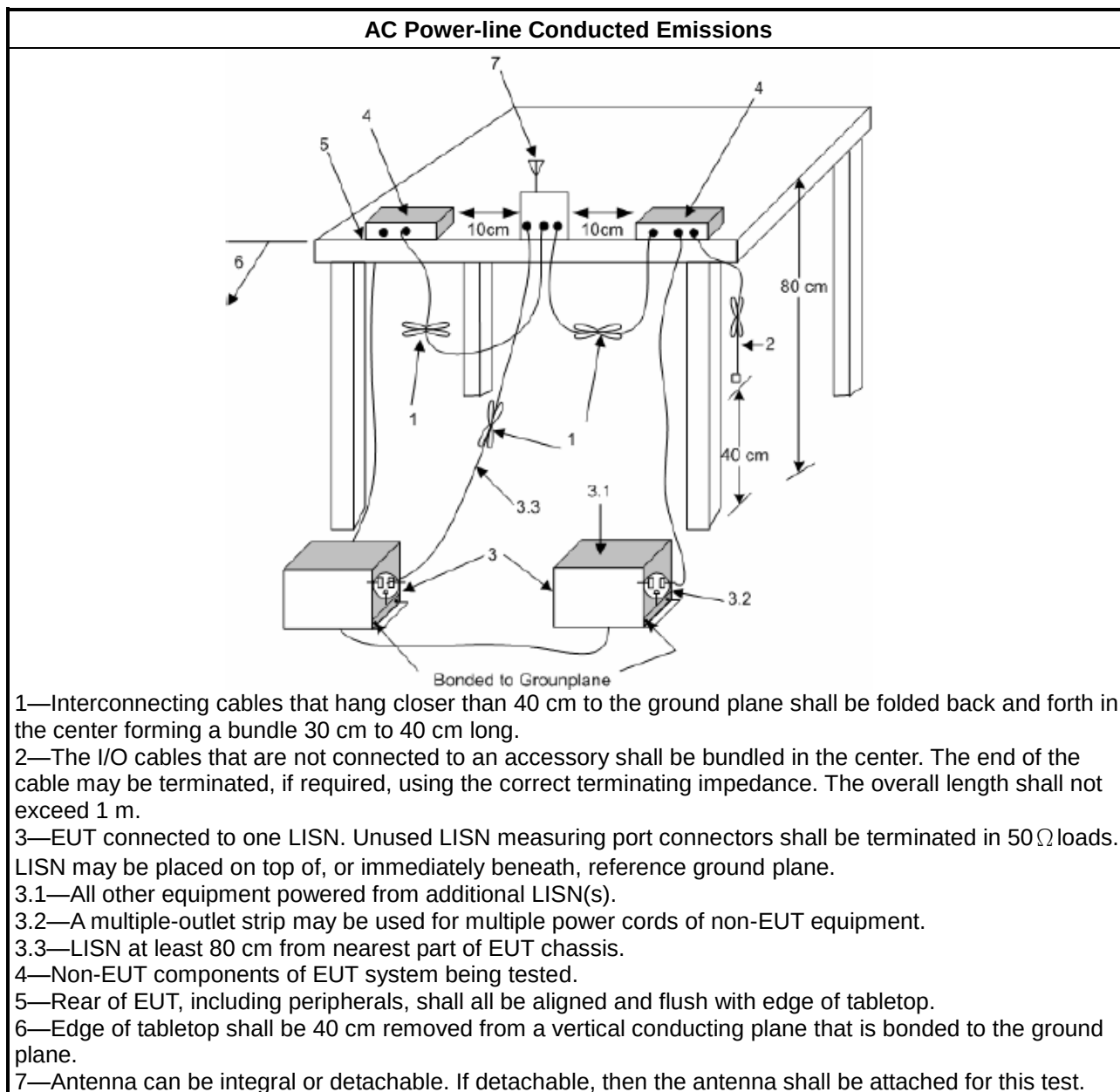
3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

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

3.1.4 Test Setup



3.1.5 Test Result of AC Power-line Conducted Emissions

Refer as Appendix A

3.2 DTS Bandwidth

3.2.1 6dB Bandwidth Limit

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

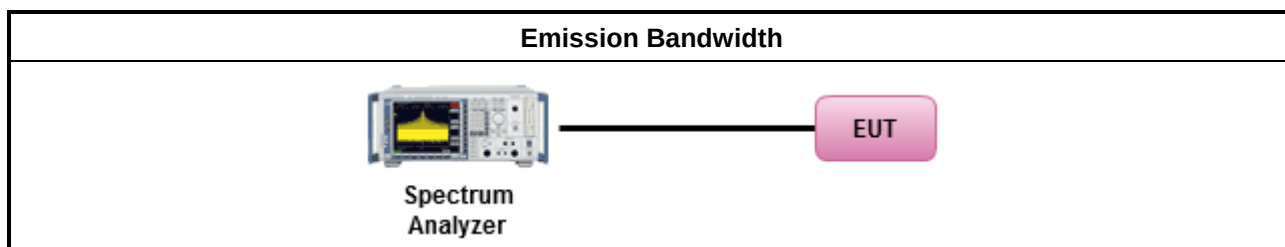
3.2.2 Measuring Instruments

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

3.2.3 Test Procedures

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



3.2.5 Test Result of Emission Bandwidth

Refer as Appendix B

3.3 Maximum Conducted Output Power

3.3.1 Maximum Conducted Output Power Limit

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

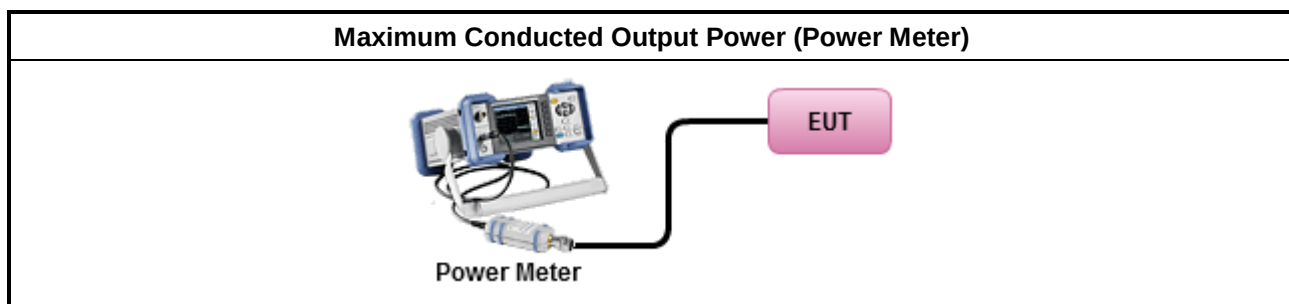
3.3.2 Measuring Instruments

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

3.3.3 Test Procedures

Test Method	
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: $P_{total} = P_1 + P_2 + \dots + P_n$ (calculated in linear unit [mW] and transfer to log unit [dBm]) $EIRP_{total} = P_{total} + DG$	

3.3.4 Test Setup



3.3.5 Test Result of Maximum Conducted Output Power

Refer as Appendix C

3.4 Power Spectral Density

3.4.1 Power Spectral Density Limit

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

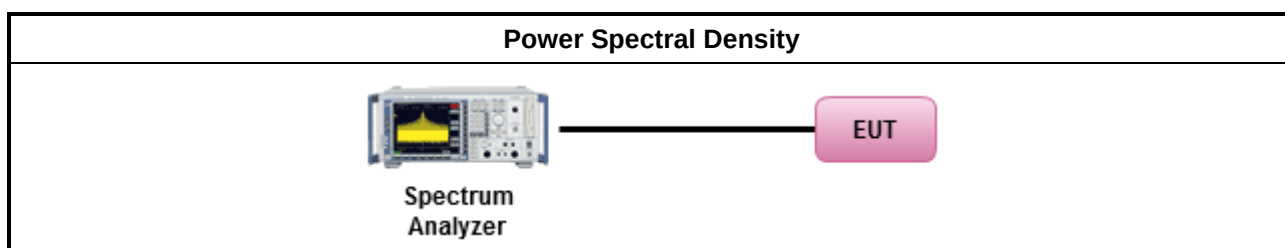
3.4.2 Measuring Instruments

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

3.4.3 Test Procedures

Test Method	
▪	Peak power spectral density procedures that the same method as used to determine the conducted output power. If maximum peak conducted output power was measured to demonstrate compliance to the output power limit, then the peak PSD procedure below (Method PKPSD) shall be used. If maximum conducted output power was measured to demonstrate compliance to the output power limit, then one of the average PSD procedures shall be used, as applicable based on the following criteria (the peak PSD procedure is also an acceptable option).
☒	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



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.	

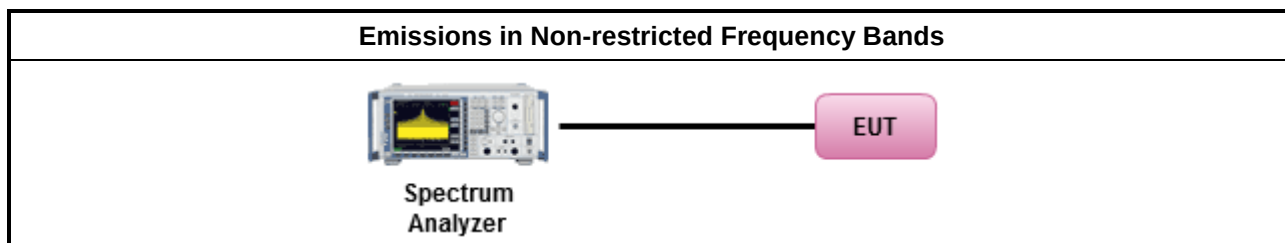
3.5.2 Measuring Instruments

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



3.5.5 Test Result of Emissions in Non-restricted Frequency Bands

Refer as Appendix E

3.6 Emissions in Restricted Frequency Bands

3.6.1 Emissions in Restricted Frequency Bands Limit

Restricted Band Emissions Limit			
Frequency Range (MHz)	Field Strength (uV/m)	Field Strength (dBuV/m)	Measure Distance (m)
0.009~0.490	2400/F(kHz)	48.5 - 13.8	300
0.490~1.705	24000/F(kHz)	33.8 - 23	30
1.705~30.0	30	29	30
30~88	100	40	3
88~216	150	43.5	3
216~960	200	46	3
Above 960	500	54	3

Note 1: Test distance for frequencies at or above 30 MHz, measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).

Note 2: Test distance for frequencies at below 30 MHz, measurements may be performed at a distance closer than the EUT limit distance; however, an attempt should be made to avoid making measurements in the near field. When performing measurements below 30 MHz at a closer distance than the limit distance, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two or more distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB / decade). The test report shall specify the extrapolation method used to determine compliance of the EUT.

Note 3: Using the distance of 1m during the test for above 18 GHz, and the test value to correct for the distance factor at 3m.

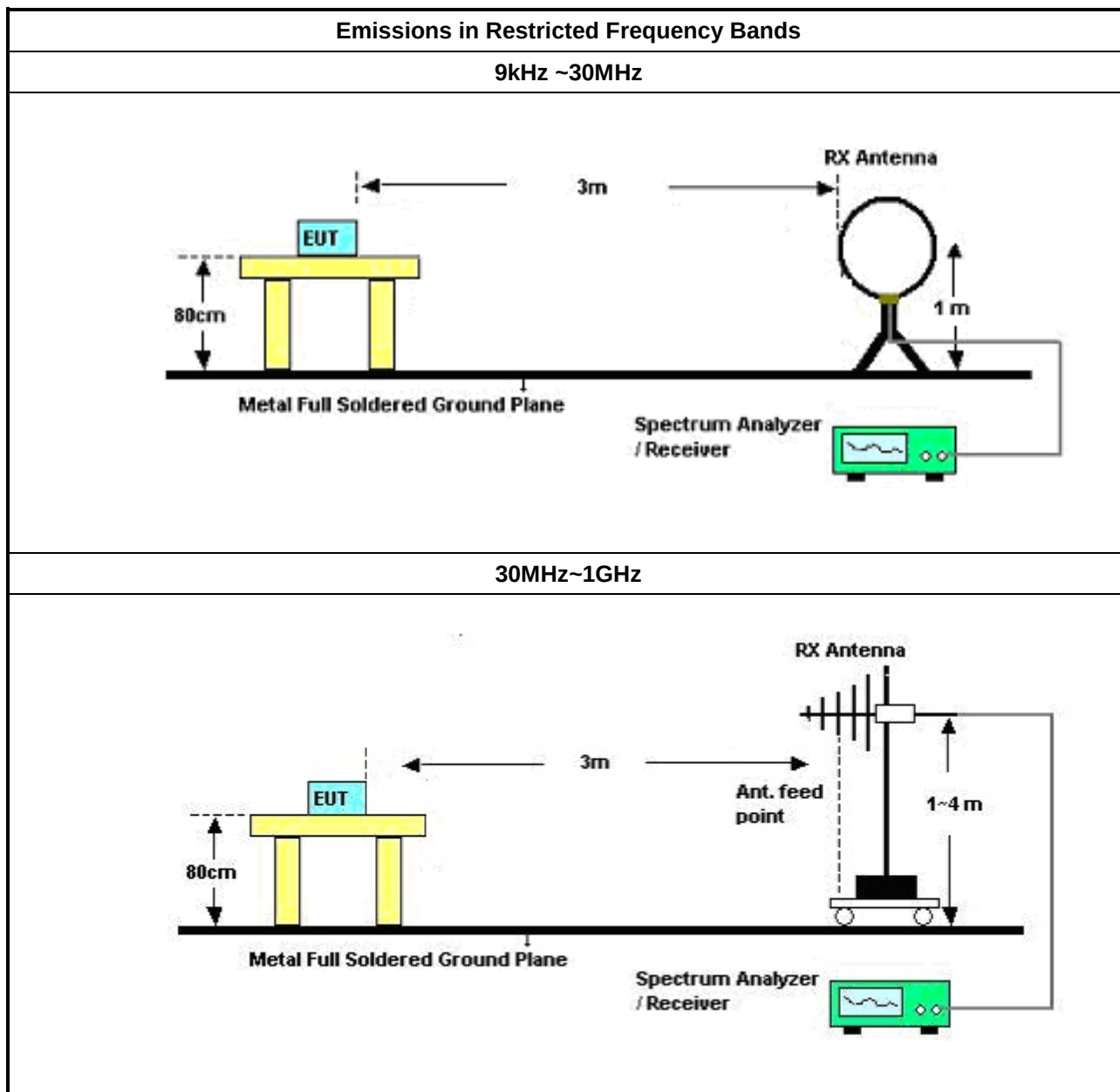
3.6.2 Measuring Instruments

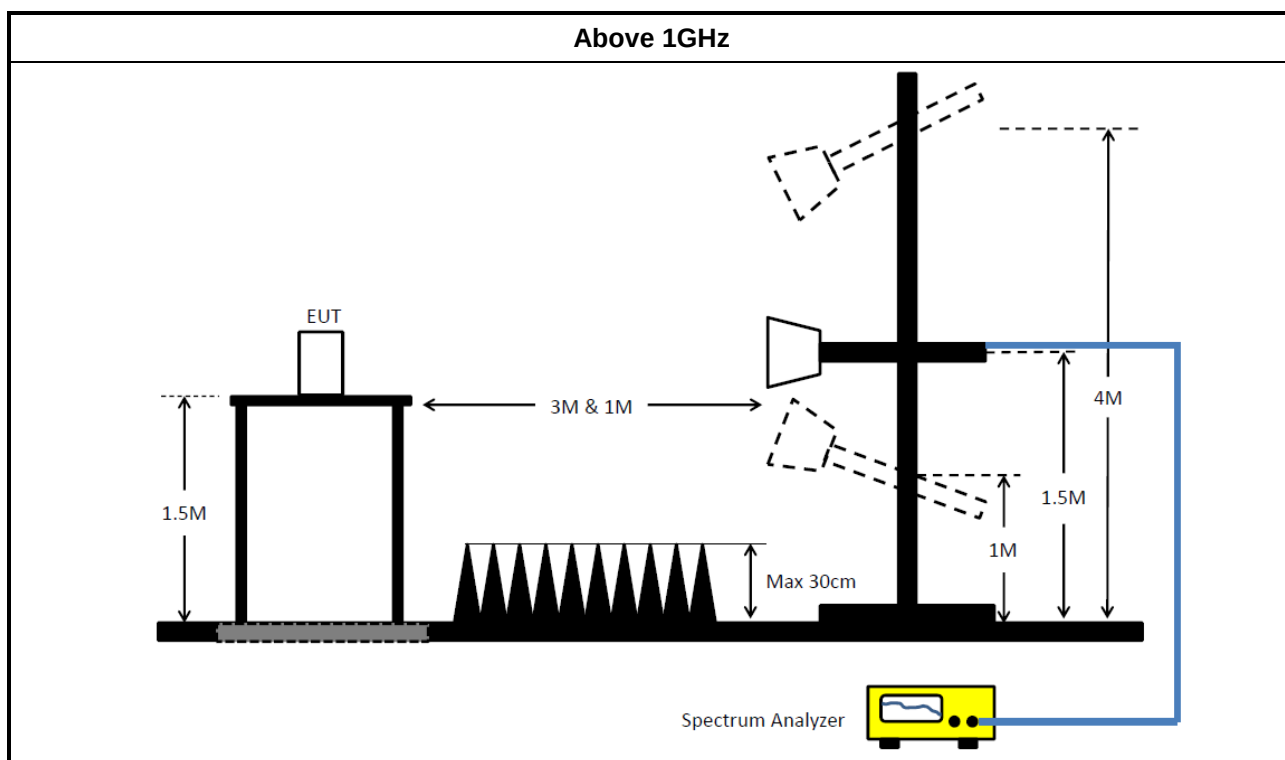
Refer a test equipment and calibration data table in this test report.

3.6.3 Test Procedures

Test Method	
The average emission levels shall be measured in [duty cycle $\geq$ 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 $f \geq 1$ 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





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	04/Nov/2019	05/Nov/2020
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	9 kHz ~ 30 MHz	24/Sep/2019	23/Sep/2020

NCR : Non-Calibration Require

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
USB Wideband Power Sensor	Agilent	U2021XA	MY54320011	50MHz~18GHz	03/Sep/2019	03/Sep/2020
USB Wideband Power Sensor	Agilent	U2021XA	MY54320013	50MHz~18GHz	03/Sep/2019	03/Sep/2020
Cable 0.2m	HUBER	MY10710/4	RF Cable - 01	30MHz ~18G	10/Jan/2020	09/Jan/2021
Cable 0.2m	HUBER	MY10711/4	RF Cable - 02	30MHz ~18G	10/Jan/2020	09/Jan/2021
Cable 1.5m	HUBER	MY33066/4	RF Cable - 30	30MHz ~18G	10/Jan/2020	09/Jan/2021
SMB100A Signal Generator	R&S	SMB100A03	181147	100kHz~40GHz	12/Nov/2018	10/Nov/2020
TEMP & humidity Chamber	GIANT FORCE	GTH-225-40-C P-AR	MAA1311-008	-40~100°C 10~98%RH	25/Jun/2019	24/Jun/2020

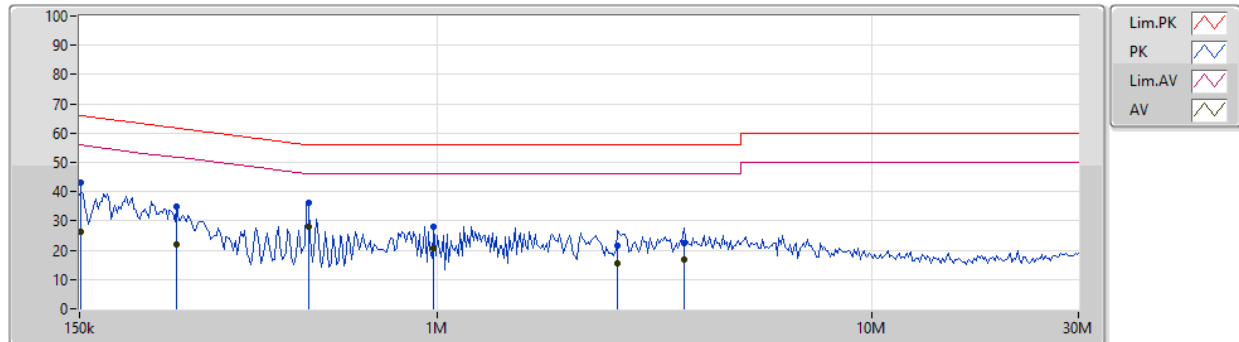
Instrument for Radiated Test

Instrument	Manufacturer	Model No.	Serial No.	Spec.	Calibration Date	Calibration Due Date
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH02-HY	30MHz ~ 1GHz 3m	29/Aug/2019	28/Aug/2020
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH02-HY	1GHz ~ 18GHz 3m	29/Aug/2019	28/Aug/2020
Amplifier	Agilent	8447D	2944A11149	100kHz ~ 1.3GHz	02/Jul/2019	01/Jul/2020
Microwave Preamplifier	Agilent	8449B	3008A02373	1GHz ~ 26.5GHz	16/Oct/2019	15/Oct/2020
Spectrum Analyzer	Rohde & Schwarz	FSV40	101500	10Hz - 40GHz	15/Aug/2019	14/Aug/2020
EMI Test Receiver	R&S	ESR3	102052	9kHz ~ 3.6GHz	09/Apr/2019	08/Apr/2020
RF Cable-R03m	Jye Bao	RG142	CB017	9kHz ~ 1GHz	26/Mar/2019	25/Mar/2020
RF Cable-high 6m	SUHNER	SUCOFLEX104	10567868 / SN805193/4	1GHz~40GHz	09/Apr/2019	08/Apr/2020
RF Cable-high 7m	SUHNER	SUCOFLEX104	10567868 / SN805192/4	1GHz~40GHz	09/Apr/2019	08/Apr/2020
Bilog Antenna & 5dB Attenuator	SCHAFFNER / MTJ	CBL 6112D / MTJ6102-05	2723 / 2	30MHz ~ 2GHz	09/Sep/2019	08/Sep/2020
Loop Antenna	TESEQ	HLA 6120	31244	9k-30MHz	15/Mar/2019	14/Mar/2020
Double Ridged Guide Horn Antenna	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 01543	1GHz ~ 18GHz	03/Jun/2019	02/Jun/2020

AC Power-line Conducted Emissions Result

Operating Mode	1	Power Phase	Neutral
Operating Function	USB mode		

22/01/2020

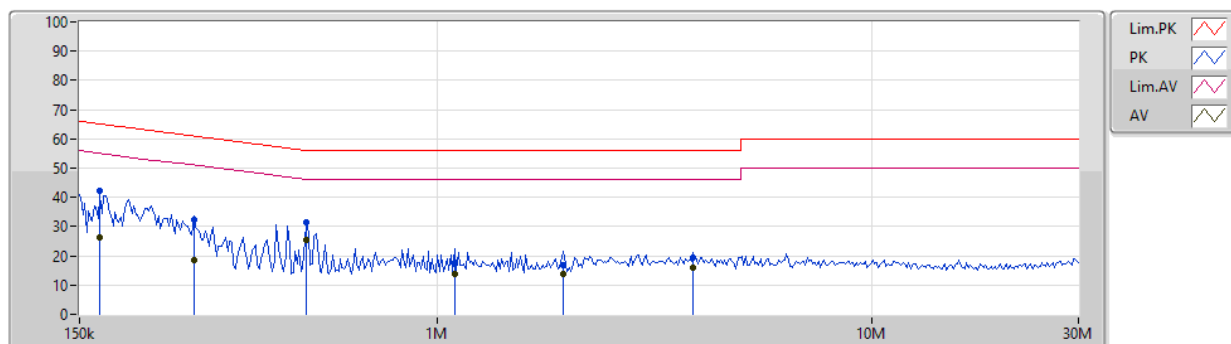


Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Factor (dB)	Condition	Comment	Raw (dBuV)	LISN (dB)	CL (dB)	AT (dB)			
QP	151.5k	43.15	65.92	-22.77	19.63	Neutral	-	23.52	9.65	0.11	9.87			
AV	151.5k	26.37	55.92	-29.55	19.63	Neutral	-	6.74	9.65	0.11	9.87			
QP	251.653k	34.83	61.70	-26.87	19.63	Neutral	-	15.20	9.64	0.12	9.87			
AV	251.653k	21.88	51.70	-29.82	19.63	Neutral	-	2.25	9.64	0.12	9.87			
QP	505.009k	36.32	56.00	-19.68	19.63	Neutral	-	16.69	9.63	0.13	9.87			
AV	505.009k	27.96	46.00	-18.04	19.63	Neutral	"Worst"	8.33	9.63	0.13	9.87			
QP	983.628k	28.02	56.00	-27.98	19.62	Neutral	-	8.40	9.63	0.11	9.88			
AV	983.628k	20.65	46.00	-25.35	19.62	Neutral	-	1.03	9.63	0.11	9.88			
QP	2.608M	21.57	56.00	-34.43	19.68	Neutral	-	1.89	9.65	0.16	9.87			
AV	2.608M	15.49	46.00	-30.51	19.68	Neutral	-	-4.19	9.65	0.16	9.87			
QP	3.695M	22.21	56.00	-33.79	19.72	Neutral	-	2.49	9.66	0.18	9.88			
AV	3.695M	16.62	46.00	-29.38	19.72	Neutral	-	-3.10	9.66	0.18	9.88			

AC Power-line Conducted Emissions Result

Operating Mode	1	Power Phase	Line
Operating Function	USB mode		

22/01/2020



Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Factor (dB)	Condition	Comment	Raw (dBuV)	LISN (dB)	CL (dB)	AT (dB)			
QP	167.35k	42.32	65.08	-22.76	19.64	Line	-	22.68	9.66	0.11	9.87			
AV	167.35k	26.15	55.08	-28.93	19.64	Line	-	6.51	9.66	0.11	9.87			
QP	275.23k	32.45	60.95	-28.50	19.64	Line	-	12.81	9.65	0.12	9.87			
AV	275.23k	18.52	50.95	-32.43	19.64	Line	-	-1.12	9.65	0.12	9.87			
QP	500k	31.31	56.00	-24.69	19.64	Line	-	11.67	9.64	0.13	9.87			
AV	500k	25.25	46.00	-20.75	19.64	Line	"Worst"	5.61	9.64	0.13	9.87			
QP	1.097M	17.60	56.00	-38.40	19.64	Line	-	-2.04	9.64	0.12	9.88			
AV	1.097M	13.79	46.00	-32.21	19.64	Line	-	-5.85	9.64	0.12	9.88			
QP	1.954M	16.84	56.00	-39.16	19.67	Line	-	-2.83	9.65	0.15	9.87			
AV	1.954M	13.93	46.00	-32.07	19.67	Line	-	-5.74	9.65	0.15	9.87			
QP	3.883M	19.61	56.00	-36.39	19.73	Line	-	-0.12	9.66	0.19	9.88			
AV	3.883M	15.90	46.00	-30.10	19.73	Line	-	-3.83	9.66	0.19	9.88			



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)	720k	1.032M	1M03F1D	717.5k	1.032M
BT-LE(2Mbps)	1.263M	2.043M	2M04F1D	1.253M	2.039M

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	720k	1.032M
2440MHz_TnomVnom	Pass	500k	717.5k	1.032M
2480MHz_TnomVnom	Pass	500k	720k	1.032M
BT-LE(2Mbps)	-	-	-	-
2402MHz_TnomVnom	Pass	500k	1.253M	2.043M
2440MHz_TnomVnom	Pass	500k	1.26M	2.041M
2480MHz_TnomVnom	Pass	500k	1.263M	2.039M

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

BT-LE(1Mbps)
2402MHz

CF
2.402GHz

Span
2.5MHz

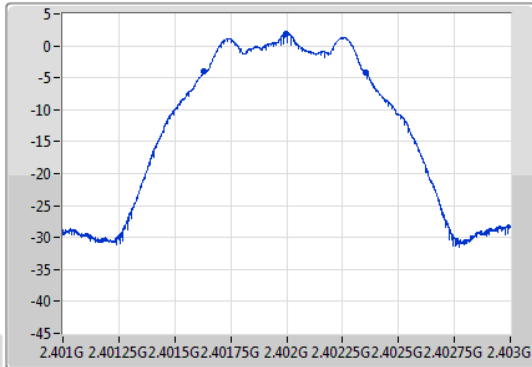
RBW
100kHz

VBW
300kHz

Sweep Time
100ms

Detector Type
Peak

Port 1 



6dB(Hz)	FI-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	FI-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
720k	2.401631G	2.402351G	1.032M	2.401493G	2.402526G	500k	1

EBW

17/01/2020

CF
2.402GHz

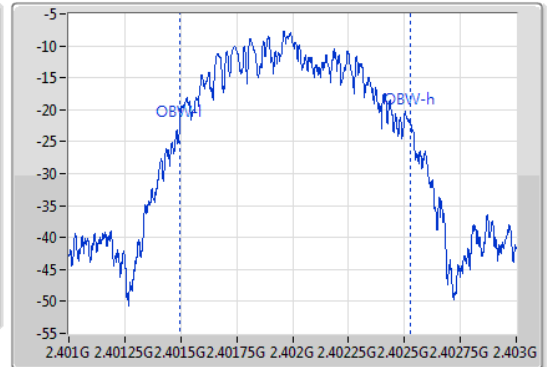
Span
2MHz

RBW
10kHz

VBW
30kHz

Sweep Time
100ms

Detector Type
Peak


BT-LE(1Mbps)
2440MHz

CF
2.44GHz

Span
2.5MHz

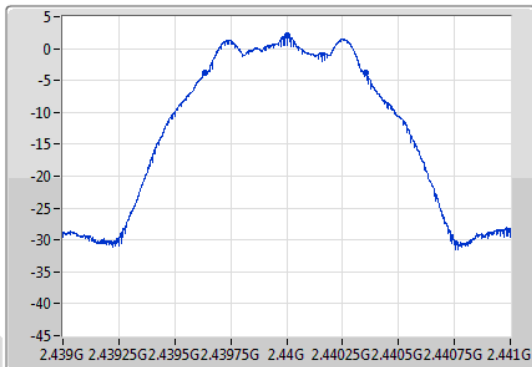
RBW
100kHz

VBW
300kHz

Sweep Time
100ms

Detector Type
Peak

Port 1 



6dB(Hz)	FI-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	FI-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
717.5k	2.439634G	2.440351G	1.032M	2.439493G	2.440526G	500k	1

CF
2.44GHz

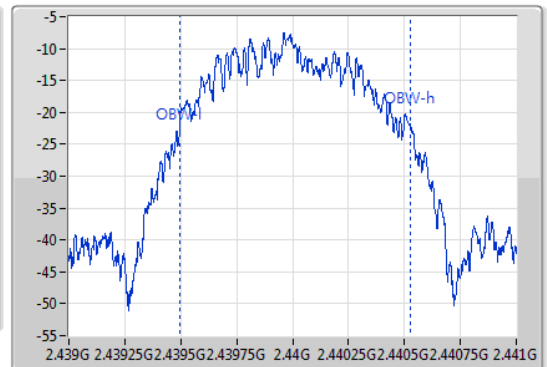
Span
2MHz

RBW
10kHz

VBW
30kHz

Sweep Time
100ms

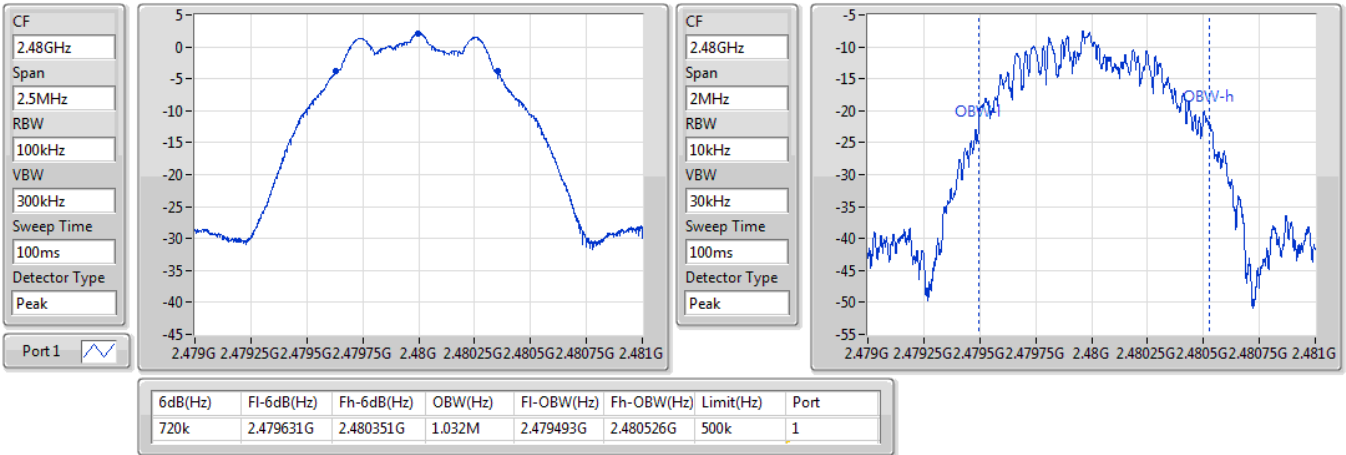
Detector Type
Peak


EBW

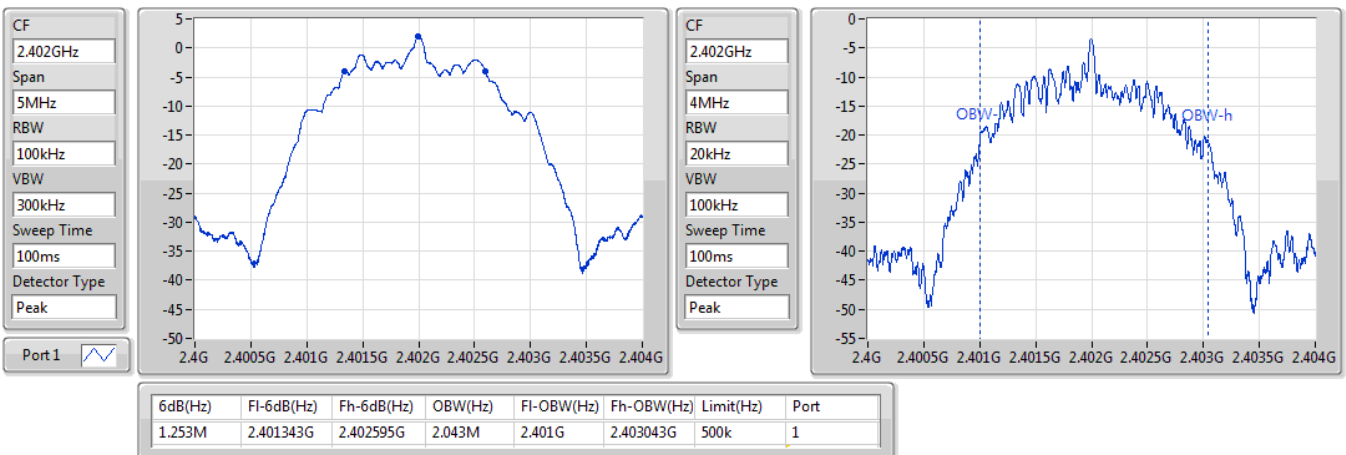
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BT-LE(1Mbps)
2480MHz

17/01/2020

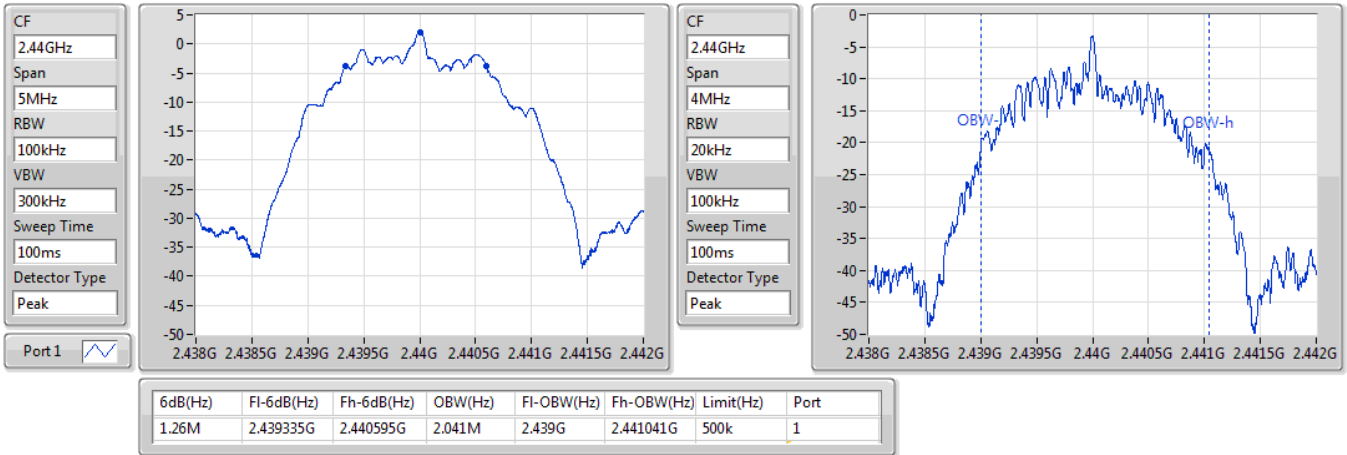

BT-LE(2Mbps)
2402MHz

17/01/2020

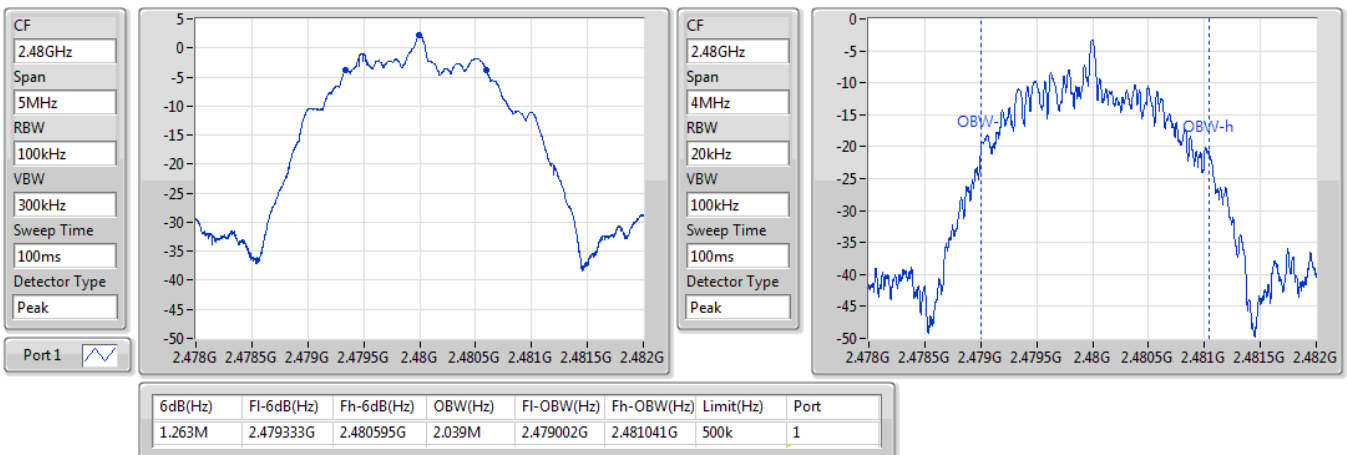


BT-LE(2Mbps)
2440MHz

17/01/2020


BT-LE(2Mbps)
2480MHz

17/01/2020





Summary

Mode	Power (dBm)	Power (W)
2.4-2.4835GHz	-	-
BT-LE(1Mbps)	2.34	0.00171
BT-LE(2Mbps)	2.31	0.00170



Result

Mode	Result	Gain (dBi)	Power (dBm)	Power Limit (dBm)
BT-LE(1Mbps)	-	-	-	-
2402MHz_TnomVnom	Pass	1.61	2.00	30.00
2440MHz_TnomVnom	Pass	1.61	2.25	30.00
2480MHz_TnomVnom	Pass	1.61	2.34	30.00
BT-LE(2Mbps)	-	-	-	-
2402MHz_TnomVnom	Pass	1.61	1.97	30.00
2440MHz_TnomVnom	Pass	1.61	2.20	30.00
2480MHz_TnomVnom	Pass	1.61	2.31	30.00

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



Summary

Mode	PD (dBm/RBW)
2.4-2.4835GHz	-
BT-LE(1Mbps)	-13.22
BT-LE(2Mbps)	-15.87

RBW=3 kHz.

Result

Mode	Result	Gain (dBi)	PD (dBm/RBW)	PD Limit (dBm/RBW)
BT-LE(1Mbps)	-	-	-	-
2402MHz_TnomVnom	Pass	1.61	-14.01	8.00
2440MHz_TnomVnom	Pass	1.61	-13.52	8.00
2480MHz_TnomVnom	Pass	1.61	-13.22	8.00
BT-LE(2Mbps)	-	-	-	-
2402MHz_TnomVnom	Pass	1.61	-17.54	8.00
2440MHz_TnomVnom	Pass	1.61	-15.89	8.00
2480MHz_TnomVnom	Pass	1.61	-15.87	8.00

DG = Directional Gain; RBW=3 kHz;

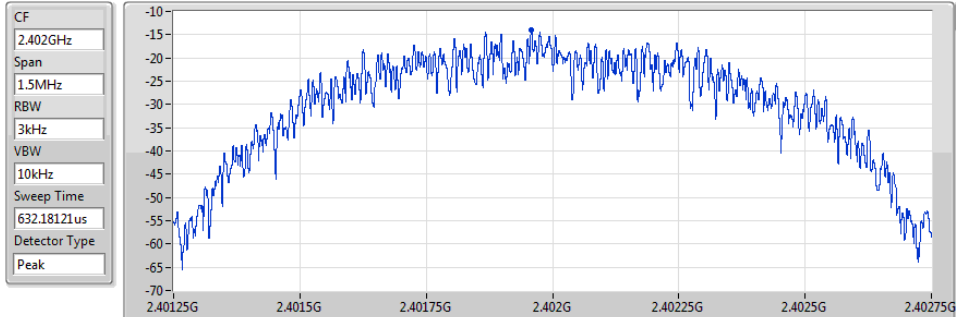
PD = trace bin-by-bin of each transmits port summing can be performed maximum power density; **Port X** = Port X power density;

BT-LE(1Mbps)

PSD

2402MHz

17/01/2020



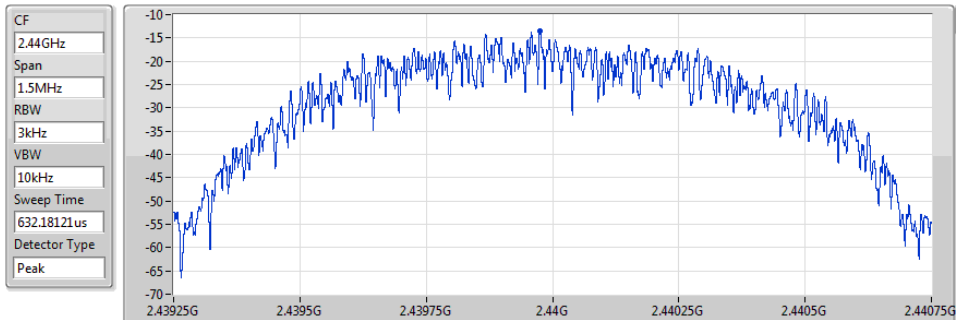
Sum	PD	Port 1
(dBm/Hz)	(dBm/Hz)	(dBm/Hz)
-14.01	-14.01	-14.01

BT-LE(1Mbps)

PSD

2440MHz

17/01/2020



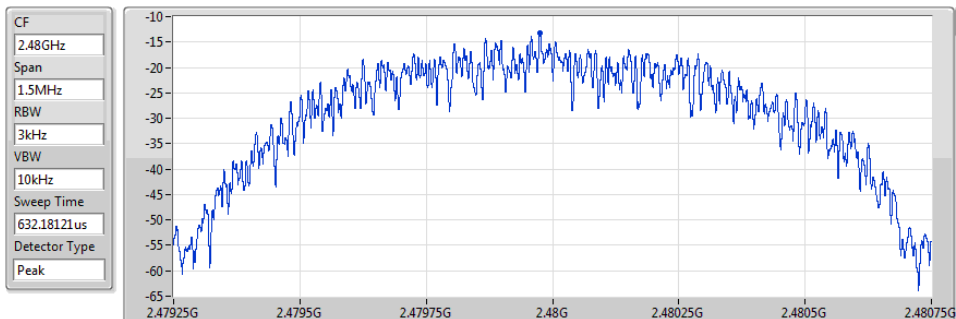
Sum	PD	Port 1
(dBm/Hz)	(dBm/Hz)	(dBm/Hz)
-13.52	-13.52	-13.52

BT-LE(1Mbps)

PSD

2480MHz

17/01/2020



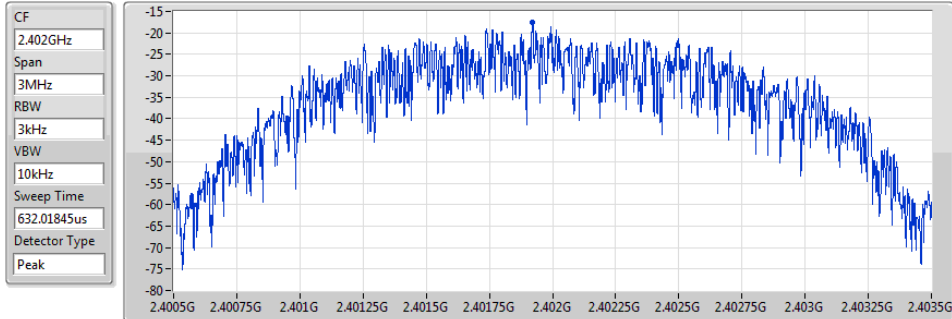
Sum	PD	Port 1
(dBm/Hz)	(dBm/Hz)	(dBm/Hz)
-13.22	-13.22	-13.22

BT-LE(2Mbps)

PSD

2402MHz

17/01/2020



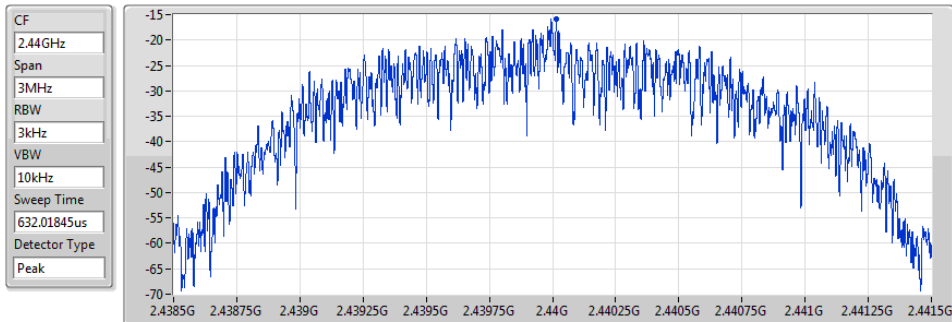
Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-17.54	-17.54	-17.54

BT-LE(2Mbps)

PSD

2440MHz

17/01/2020



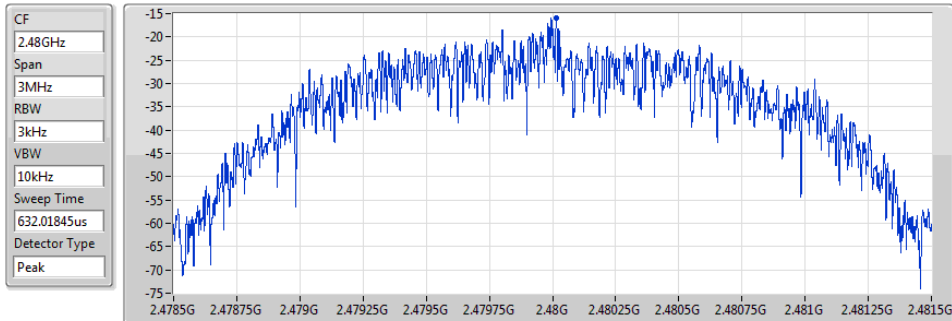
Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-15.89	-15.89	-15.89

BT-LE(2Mbps)

PSD

2480MHz

17/01/2020



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-15.87	-15.87	-15.87



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)	Freq (Hz)	Level (dBm)	Port
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BT-LE(1Mbps)	Pass	2.47999G	2.27	-27.73	2.06363G	-55.04	2.39401G	-49.61	2.4G	-52.28	2.48463G	-52.79	17.48898G	-41.42	1
BT-LE(2Mbps)	Pass	2.48003G	2.24	-27.76	2.11915G	-53.82	2.39999G	-29.10	2.4G	-29.06	2.50104G	-52.14	16.29104G	-42.13	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)	Freq (Hz)	Level (dBm)	Port
BT-LE(1Mbps)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2402MHz_TnomVnom	Pass	2.47999G	2.27	-27.73	2.06363G	-55.04	2.39401G	-49.61	2.4G	-52.28	2.48463G	-52.79	17.48898G	-41.42	1
2440MHz_TnomVnom	Pass	2.47999G	2.27	-27.73	2.06716G	-53.13	2.3905G	-53.63	2.4G	-56.38	2.49701G	-52.29	16.96594G	-42.79	1
2480MHz_TnomVnom	Pass	2.47999G	2.27	-27.73	2.13736G	-54.96	2.3992G	-53.61	2.4835G	-55.50	2.48798G	-50.73	16.97719G	-42.46	1
BT-LE(2Mbps)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2402MHz_TnomVnom	Pass	2.48003G	2.24	-27.76	2.11915G	-53.82	2.39999G	-29.10	2.4G	-29.06	2.50104G	-52.14	16.29104G	-42.13	1
2440MHz_TnomVnom	Pass	2.48003G	2.24	-27.76	2.13589G	-54.36	2.39259G	-53.54	2.4835G	-55.37	2.4894G	-51.41	17.00249G	-42.32	1
2480MHz_TnomVnom	Pass	2.48003G	2.24	-27.76	2.13178G	-54.91	2.3903G	-54.03	2.4835G	-51.62	2.48801G	-51.54	24.80034G	-41.39	1

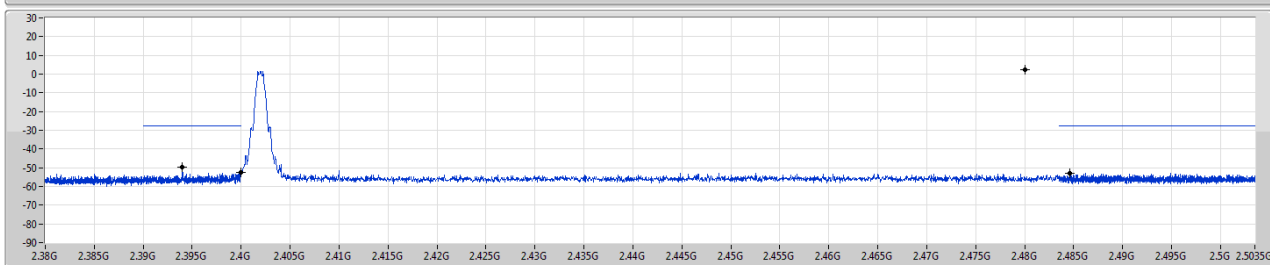
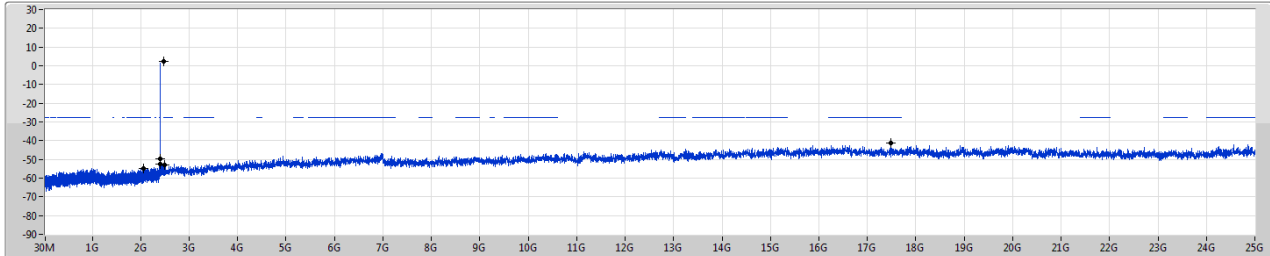
BT-LE(1Mbps)

2402MHz

CSE NdB

17/01/2020

Port1



RBW (Hz)
100k
VBW (Hz)
300k
Detector
Peak

Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.47999G	2.27	-27.73	2.06363G	-55.04	2.39401G	-49.61	2.4G	-52.28	2.48463G	-52.79	17.48898G	-41.42	1

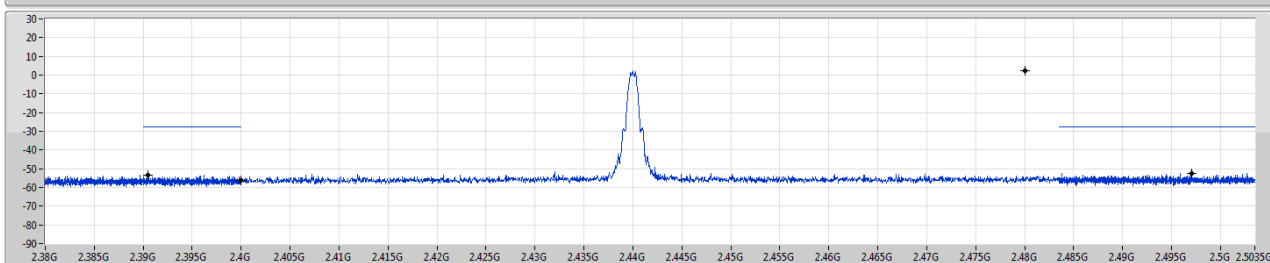
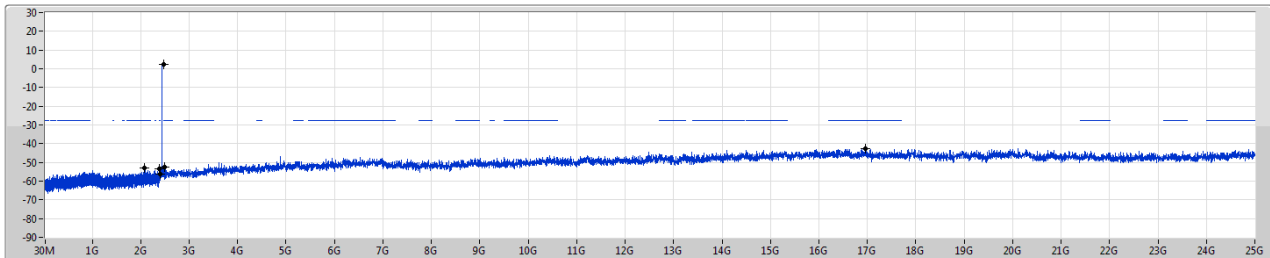
BT-LE(1Mbps)

2440MHz

CSE NdB

17/01/2020

Port1



RBW (Hz)
100k
VBW (Hz)
300k
Detector
Peak

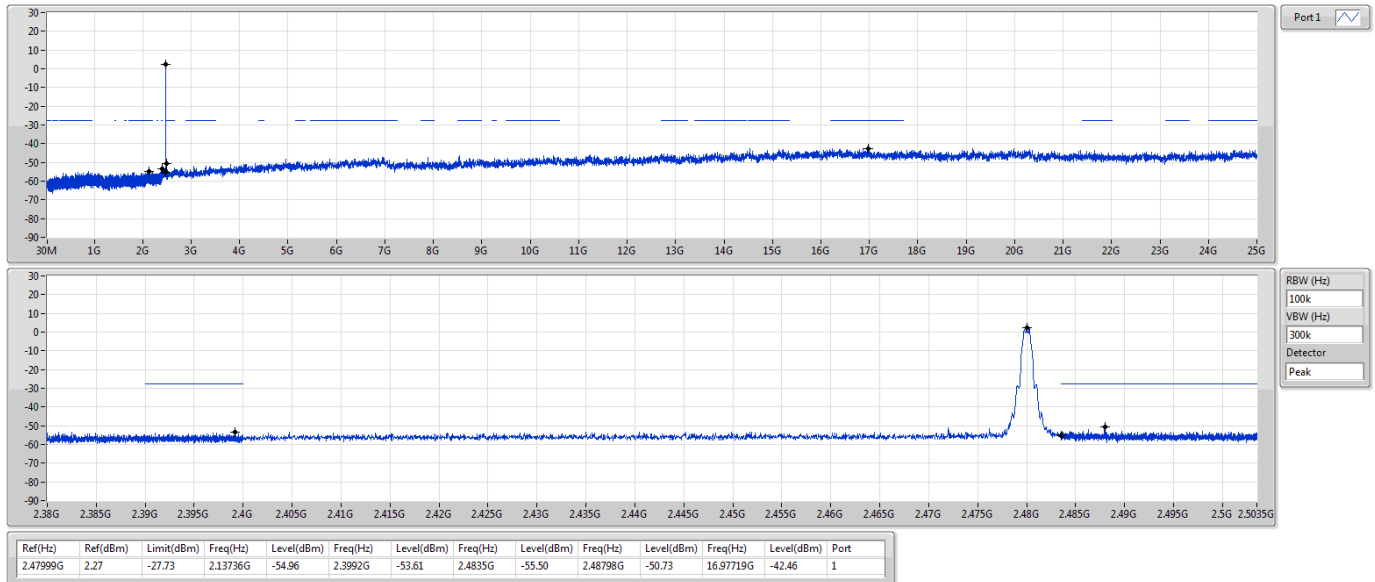
Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.47999G	2.27	-27.73	2.06716G	-53.13	2.3905G	-53.63	2.4G	-56.38	2.49701G	-52.29	16.96594G	-42.79	1

BT-LE(1Mbps)

2480MHz

CSE NdB

17/01/2020

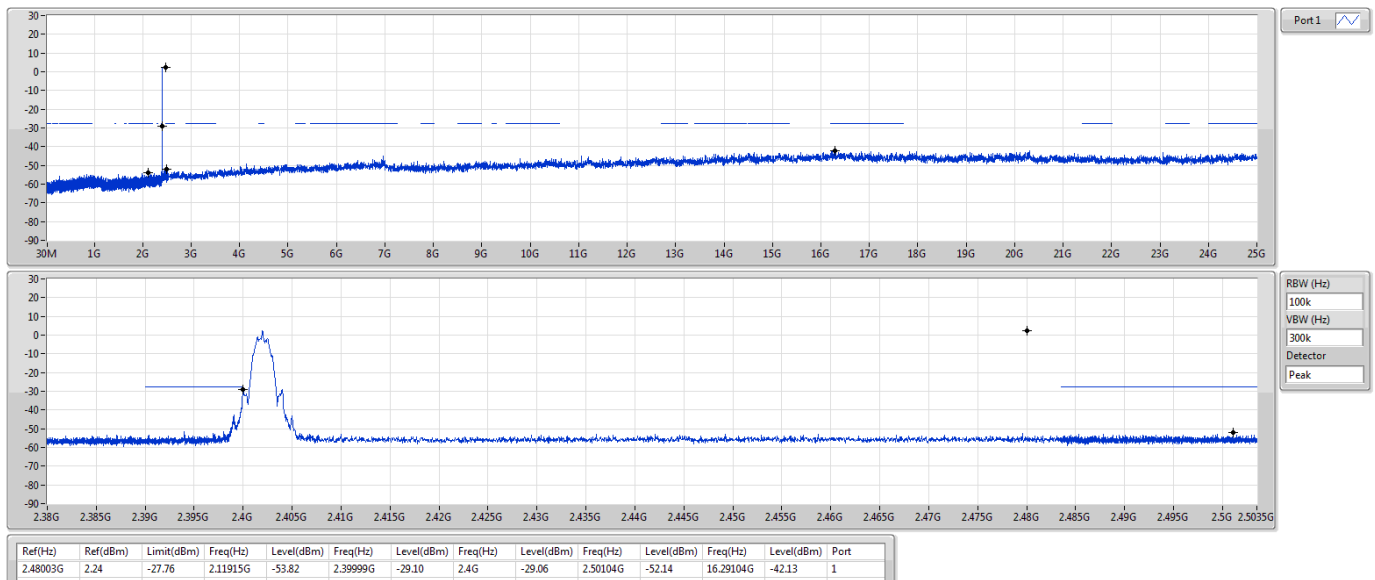


BT-LE(2Mbps)

2402MHz

CSE NdB

17/01/2020



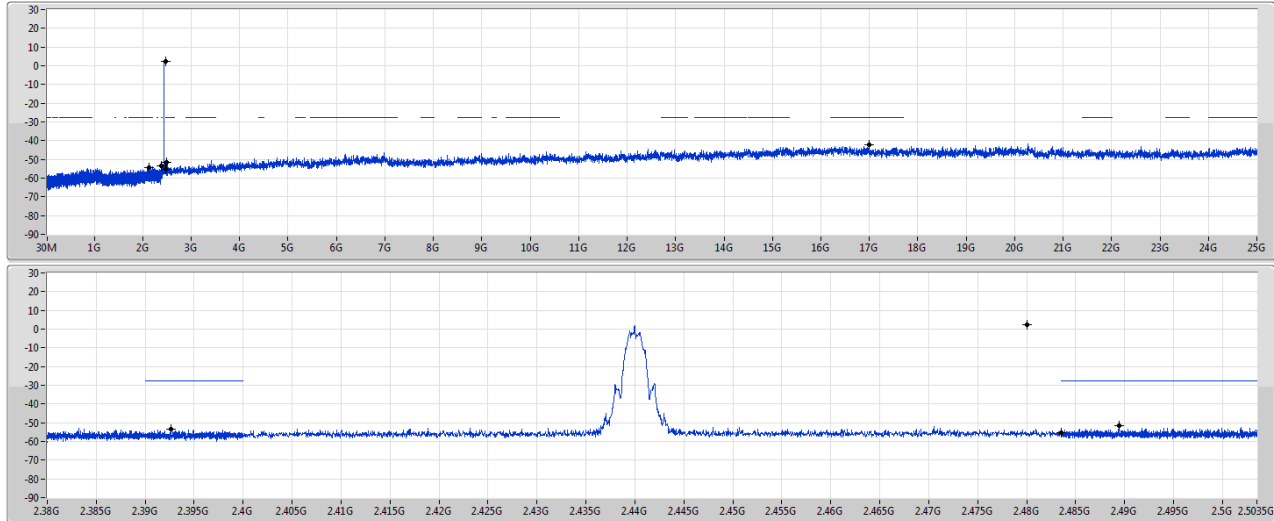
BT-LE(2Mbps)

2440MHz

CSE NdB

17/01/2020

Port 1



RBW (Hz)
100k
VBW (Hz)
300k
Detector
Peak

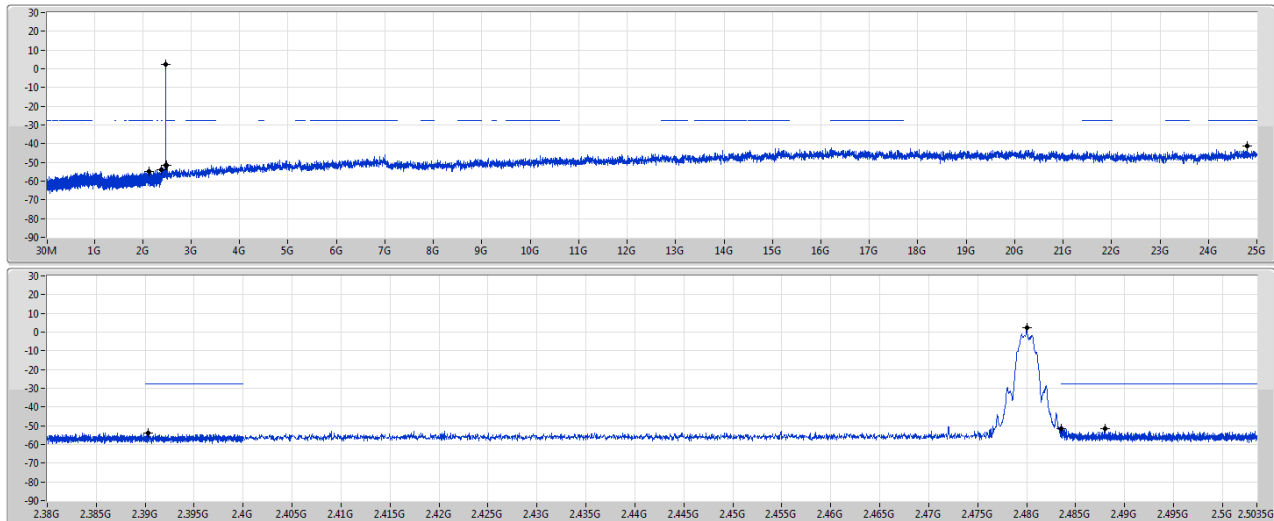
BT-LE(2Mbps)

2480MHz

CSE NdB

17/01/2020

Port 1



RBW (Hz)
100k
VBW (Hz)
300k
Detector
Peak



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(2Mbps)	Pass	PK	734.22M	37.35	46.00	-8.65	3	Vertical	0	1.00	-

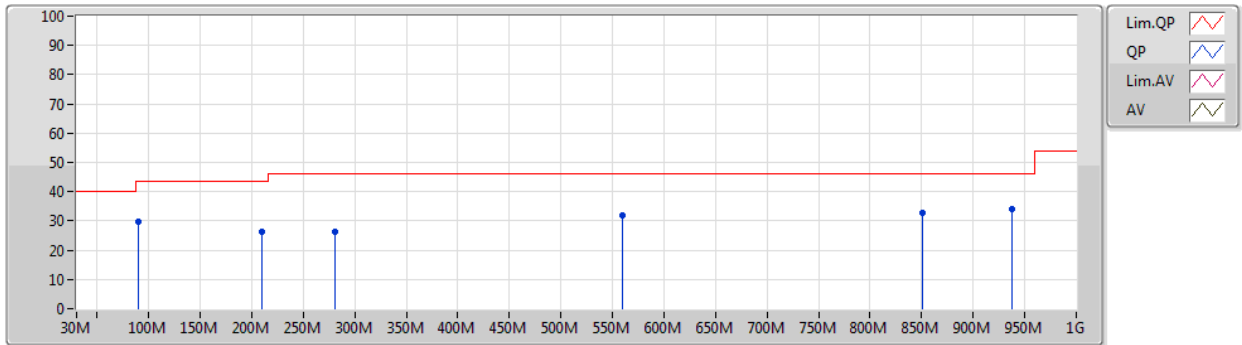
Result

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
BT-LE(2Mbps)	-	-	-	-	-	-	-	-	-	-	-
2440MHz	Pass	PK	90.14M	29.78	43.50	-13.72	3	Vertical	360	1.00	-
2440MHz	Pass	PK	210.42M	26.24	43.50	-17.26	3	Vertical	360	1.00	-
2440MHz	Pass	PK	280.26M	26.37	46.00	-19.63	3	Vertical	360	1.00	-
2440MHz	Pass	PK	559.62M	31.89	46.00	-14.11	3	Vertical	360	1.00	-
2440MHz	Pass	PK	850.62M	32.62	46.00	-13.38	3	Vertical	360	1.00	-
2440MHz	Pass	PK	937.92M	33.91	46.00	-12.09	3	Vertical	360	1.00	-
2440MHz	Pass	PK	210.42M	34.72	43.50	-8.78	3	Horizontal	0	1.00	-
2440MHz	Pass	PK	272.5M	34.84	46.00	-11.16	3	Horizontal	0	1.00	-
2440MHz	Pass	PK	61.04M	28.35	40.00	-11.65	3	Horizontal	0	1.00	-
2440MHz	Pass	PK	559.62M	35.63	46.00	-10.37	3	Horizontal	0	1.00	-
2440MHz	Pass	PK	701.24M	32.57	46.00	-13.43	3	Horizontal	0	1.00	-
2440MHz	Pass	PK	910.76M	34.84	46.00	-11.16	3	Horizontal	0	1.00	-

BT-LE(2Mbps)

2440MHz_USB

21/01/2020

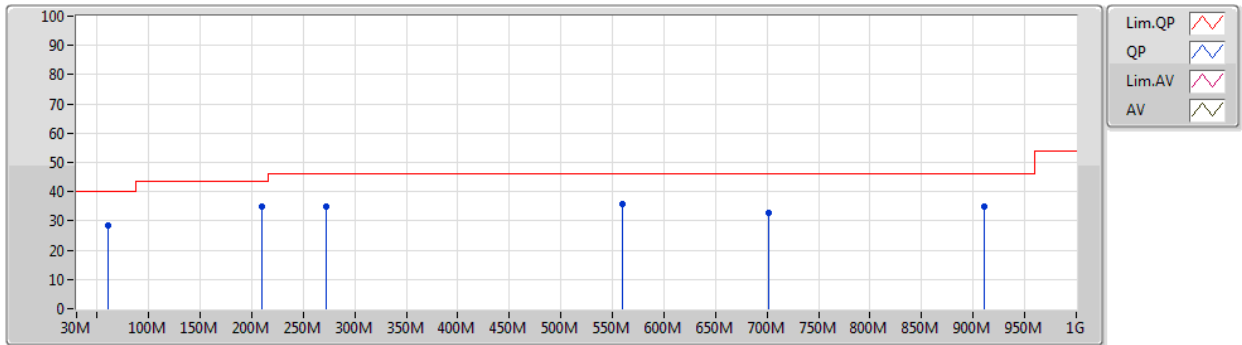


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
PK	90.14M	29.78	43.50	-13.72	-12.38	3	Vertical	360	1.00	-	42.16	13.98	1.39	27.75
PK	210.42M	26.24	43.50	-17.26	-10.72	3	Vertical	360	1.00	-	36.96	14.16	2.47	27.35
PK	280.26M	26.37	46.00	-19.63	-6.34	3	Vertical	360	1.00	-	32.71	17.95	2.88	27.17
PK	559.62M	31.89	46.00	-14.11	-1.12	3	Vertical	360	1.00	-	33.01	23.88	3.61	28.61
PK	850.62M	32.62	46.00	-13.38	1.51	3	Vertical	360	1.00	-	31.11	25.32	4.25	28.06
PK	937.92M	33.91	46.00	-12.09	2.81	3	Vertical	360	1.00	-	31.10	25.70	4.74	27.63

BT-LE(2Mbps)

2440MHz_USB

21/01/2020



Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
PK	210.42M	34.72	43.50	-8.78	-10.72	3	Horizontal	0	1.00	-	45.44	14.16	2.47	27.35
PK	272.5M	34.84	46.00	-11.16	-6.33	3	Horizontal	0	1.00	-	41.17	18.03	2.82	27.18
PK	61.04M	28.35	40.00	-11.65	-15.32	3	Horizontal	0	1.00	-	43.67	11.43	0.95	27.70
PK	559.62M	35.63	46.00	-10.37	-1.12	3	Horizontal	0	1.00	-	36.75	23.88	3.61	28.61
PK	701.24M	32.57	46.00	-13.43	-0.41	3	Horizontal	0	1.00	-	32.98	23.92	4.05	28.38
PK	910.76M	34.84	46.00	-11.16	2.34	3	Horizontal	0	1.00	-	32.50	25.55	4.46	27.67



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	2.4902G	48.53	54.00	-5.47	3	Horizontal	159	1.00	-
BT-LE(2Mbps)	Pass	AV	2.497G	49.98	54.00	-4.02	3	Vertical	37	2.87	-

Result

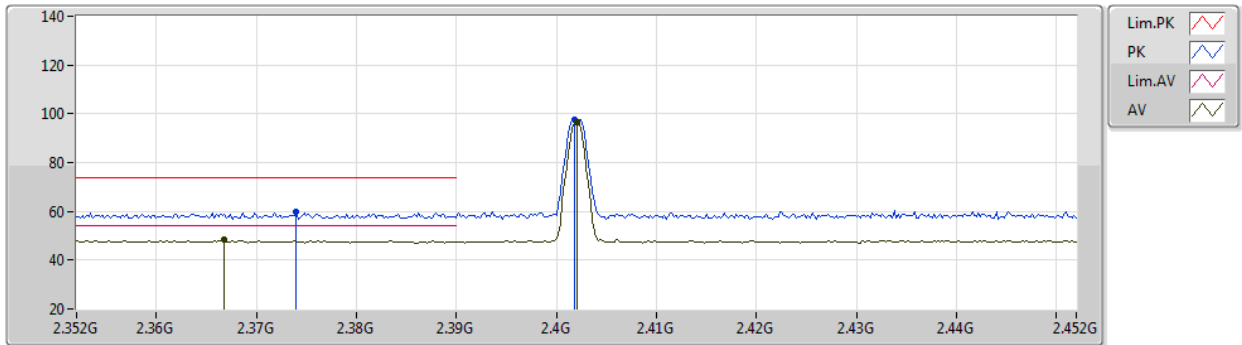
Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
BT-LE(1Mbps)	-	-	-	-	-	-	-	-	-	-	-
2402MHz	Pass	AV	2.3668G	48.29	54.00	-5.71	3	Vertical	36	2.71	-
2402MHz	Pass	AV	2.402G	96.68	Inf	-Inf	3	Vertical	36	2.71	-
2402MHz	Pass	PK	2.374G	59.57	74.00	-14.43	3	Vertical	36	2.71	-
2402MHz	Pass	PK	2.4018G	97.62	Inf	-Inf	3	Vertical	36	2.71	-
2402MHz	Pass	AV	2.3858G	48.03	54.00	-5.97	3	Horizontal	155	1.00	-
2402MHz	Pass	AV	2.402G	90.09	Inf	-Inf	3	Horizontal	155	1.00	-
2402MHz	Pass	PK	2.3886G	59.65	74.00	-14.35	3	Horizontal	155	1.00	-
2402MHz	Pass	PK	2.4022G	91.10	Inf	-Inf	3	Horizontal	155	1.00	-
2402MHz	Pass	AV	4.80392G	42.76	54.00	-11.24	3	Vertical	114	2.27	-
2402MHz	Pass	PK	4.80351G	51.73	74.00	-22.27	3	Vertical	114	2.27	-
2402MHz	Pass	AV	4.80399G	46.73	54.00	-7.27	3	Horizontal	118	3.00	-
2402MHz	Pass	PK	4.80448G	54.56	74.00	-19.44	3	Horizontal	118	3.00	-
2440MHz	Pass	AV	2.3472G	48.16	54.00	-5.84	3	Vertical	38	2.95	-
2440MHz	Pass	AV	2.44G	97.26	Inf	-Inf	3	Vertical	38	2.95	-
2440MHz	Pass	AV	2.4912G	48.30	54.00	-5.70	3	Vertical	38	2.95	-
2440MHz	Pass	PK	2.3584G	60.37	74.00	-13.63	3	Vertical	38	2.95	-
2440MHz	Pass	PK	2.4396G	98.24	Inf	-Inf	3	Vertical	38	2.95	-
2440MHz	Pass	PK	2.49G	60.24	74.00	-13.76	3	Vertical	38	2.95	-
2440MHz	Pass	AV	2.3832G	48.33	54.00	-5.67	3	Horizontal	52	2.85	-
2440MHz	Pass	AV	2.44G	90.10	Inf	-Inf	3	Horizontal	52	2.85	-
2440MHz	Pass	AV	2.4932G	48.10	54.00	-5.90	3	Horizontal	52	2.85	-
2440MHz	Pass	PK	2.3476G	60.42	74.00	-13.58	3	Horizontal	52	2.85	-
2440MHz	Pass	PK	2.4404G	91.19	Inf	-Inf	3	Horizontal	52	2.85	-
2440MHz	Pass	PK	2.492G	59.54	74.00	-14.46	3	Horizontal	52	2.85	-
2440MHz	Pass	AV	4.88004G	41.34	54.00	-12.66	3	Vertical	121	2.33	-
2440MHz	Pass	PK	4.87959G	50.68	74.00	-23.32	3	Vertical	121	2.33	-
2440MHz	Pass	AV	4.87964G	40.01	54.00	-13.99	3	Horizontal	99	1.29	-
2440MHz	Pass	PK	4.87942G	50.49	74.00	-23.51	3	Horizontal	99	1.29	-
2480MHz	Pass	AV	2.48G	97.35	Inf	-Inf	3	Vertical	40	2.95	-
2480MHz	Pass	AV	2.4842G	48.06	54.00	-5.94	3	Vertical	40	2.95	-
2480MHz	Pass	PK	2.4798G	98.31	Inf	-Inf	3	Vertical	40	2.95	-
2480MHz	Pass	PK	2.4934G	58.98	74.00	-15.02	3	Vertical	40	2.95	-
2480MHz	Pass	AV	2.48G	89.45	Inf	-Inf	3	Horizontal	159	1.00	-
2480MHz	Pass	AV	2.4902G	48.53	54.00	-5.47	3	Horizontal	159	1.00	-
2480MHz	Pass	PK	2.4798G	90.45	Inf	-Inf	3	Horizontal	159	1.00	-
2480MHz	Pass	PK	2.4902G	59.59	74.00	-14.41	3	Horizontal	159	1.00	-
2480MHz	Pass	AV	4.95997G	40.93	54.00	-13.07	3	Vertical	118	2.27	-
2480MHz	Pass	PK	4.95943G	50.67	74.00	-23.33	3	Vertical	118	2.27	-
2480MHz	Pass	AV	4.96G	43.36	54.00	-10.64	3	Horizontal	111	3.00	-
2480MHz	Pass	PK	4.96054G	51.18	74.00	-22.82	3	Horizontal	111	3.00	-
BT-LE(2Mbps)	-	-	-	-	-	-	-	-	-	-	-
2402MHz	Pass	AV	2.3562G	49.68	54.00	-4.32	3	Vertical	38	3.00	-
2402MHz	Pass	AV	2.402G	95.22	Inf	-Inf	3	Vertical	38	3.00	-
2402MHz	Pass	PK	2.3598G	59.77	74.00	-14.23	3	Vertical	38	3.00	-
2402MHz	Pass	PK	2.4026G	97.63	Inf	-Inf	3	Vertical	38	3.00	-
2402MHz	Pass	AV	2.3552G	49.88	54.00	-4.12	3	Horizontal	153	2.91	-
2402MHz	Pass	AV	2.402G	88.45	Inf	-Inf	3	Horizontal	153	2.91	-

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
2402MHz	Pass	PK	2.383G	59.60	74.00	-14.40	3	Horizontal	153	2.91	-
2402MHz	Pass	PK	2.4014G	90.89	Inf	-Inf	3	Horizontal	153	2.91	-
2402MHz	Pass	AV	4.80286G	43.17	54.00	-10.83	3	Vertical	116	2.96	-
2402MHz	Pass	PK	4.80514G	51.75	74.00	-22.25	3	Vertical	116	2.96	-
2402MHz	Pass	AV	4.80294G	45.03	54.00	-8.97	3	Horizontal	99	1.02	-
2402MHz	Pass	PK	4.80291G	52.51	74.00	-21.49	3	Horizontal	99	1.02	-
2440MHz	Pass	AV	2.3696G	49.55	54.00	-4.45	3	Vertical	36	3.00	-
2440MHz	Pass	AV	2.44G	95.12	Inf	-Inf	3	Vertical	36	3.00	-
2440MHz	Pass	AV	2.4844G	49.66	54.00	-4.34	3	Vertical	36	3.00	-
2440MHz	Pass	PK	2.3468G	59.81	74.00	-14.19	3	Vertical	36	3.00	-
2440MHz	Pass	PK	2.4396G	97.46	Inf	-Inf	3	Vertical	36	3.00	-
2440MHz	Pass	PK	2.484G	59.91	74.00	-14.09	3	Vertical	36	3.00	-
2440MHz	Pass	AV	2.3552G	49.83	54.00	-4.17	3	Horizontal	159	1.11	-
2440MHz	Pass	AV	2.44G	87.79	Inf	-Inf	3	Horizontal	159	1.11	-
2440MHz	Pass	AV	2.4868G	49.50	54.00	-4.50	3	Horizontal	159	1.11	-
2440MHz	Pass	PK	2.352G	59.64	74.00	-14.36	3	Horizontal	159	1.11	-
2440MHz	Pass	PK	2.44G	90.21	Inf	-Inf	3	Horizontal	159	1.11	-
2440MHz	Pass	PK	2.4884G	60.07	74.00	-13.93	3	Horizontal	159	1.11	-
2440MHz	Pass	AV	4.88G	41.94	54.00	-12.06	3	Vertical	116	2.33	-
2440MHz	Pass	PK	4.87887G	50.34	74.00	-23.66	3	Vertical	116	2.33	-
2440MHz	Pass	AV	4.88016G	39.43	54.00	-14.57	3	Horizontal	95	1.01	-
2440MHz	Pass	PK	4.88092G	49.91	74.00	-24.09	3	Horizontal	95	1.01	-
2480MHz	Pass	AV	2.48G	95.57	Inf	-Inf	3	Vertical	37	2.87	-
2480MHz	Pass	AV	2.497G	49.98	54.00	-4.02	3	Vertical	37	2.87	-
2480MHz	Pass	PK	2.4794G	97.91	Inf	-Inf	3	Vertical	37	2.87	-
2480MHz	Pass	PK	2.486G	59.47	74.00	-14.53	3	Vertical	37	2.87	-
2480MHz	Pass	AV	2.48G	87.31	Inf	-Inf	3	Horizontal	157	1.00	-
2480MHz	Pass	AV	2.4864G	49.82	54.00	-4.18	3	Horizontal	157	1.00	-
2480MHz	Pass	PK	2.4794G	89.79	Inf	-Inf	3	Horizontal	157	1.00	-
2480MHz	Pass	PK	2.4894G	59.93	74.00	-14.07	3	Horizontal	157	1.00	-
2480MHz	Pass	AV	4.95902G	38.95	54.00	-15.05	3	Vertical	121	1.48	-
2480MHz	Pass	PK	4.95908G	48.48	74.00	-25.52	3	Vertical	121	1.48	-
2480MHz	Pass	AV	4.9589G	42.48	54.00	-11.52	3	Horizontal	111	3.00	-
2480MHz	Pass	PK	4.96086G	51.31	74.00	-22.69	3	Horizontal	111	3.00	-

BT-LE(1Mbps)

2402MHz_TX

20/01/2020

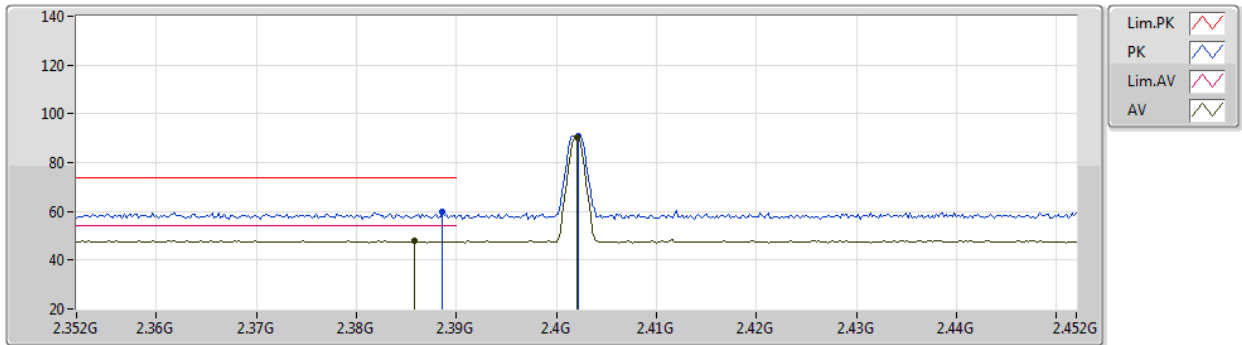


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	2.3668G	48.29	54.00	-5.71	35.07	3	Vertical	36	2.71	-	13.22	27.73	7.34	-
AV	2.402G	96.68	Inf	-Inf	34.93	3	Vertical	36	2.71	-	61.75	27.60	7.33	-
PK	2.374G	59.57	74.00	-14.43	35.04	3	Vertical	36	2.71	-	24.53	27.70	7.34	-
PK	2.4018G	97.62	Inf	-Inf	34.93	3	Vertical	36	2.71	-	62.69	27.60	7.33	-

BT-LE(1Mbps)

2402MHz_TX

20/01/2020

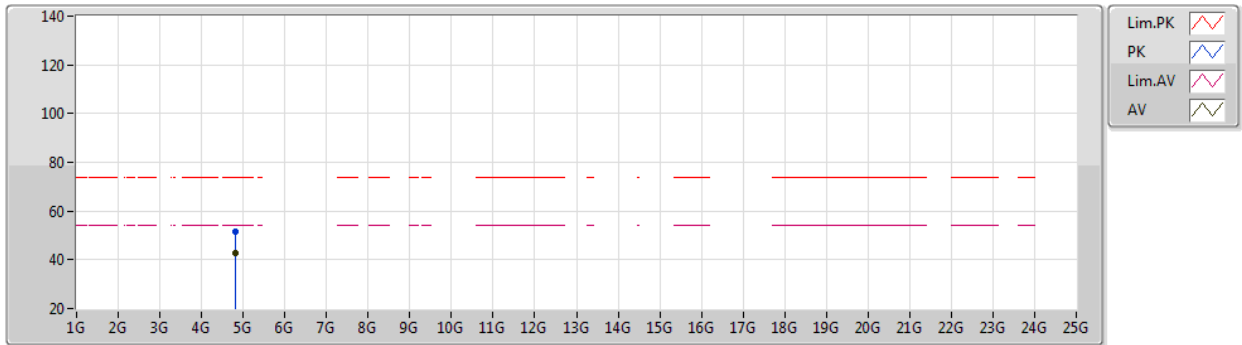


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	2.3858G	48.03	54.00	-5.97	34.99	3	Horizontal	155	1.00	-	13.04	27.66	7.33	-
AV	2.402G	90.09	Inf	-Inf	34.93	3	Horizontal	155	1.00	-	55.16	27.60	7.33	-
PK	2.3886G	59.65	74.00	-14.35	34.98	3	Horizontal	155	1.00	-	24.67	27.65	7.33	-
PK	2.4022G	91.10	Inf	-Inf	34.93	3	Horizontal	155	1.00	-	56.17	27.60	7.33	-

BT-LE(1Mbps)

2402MHz_TX

20/01/2020

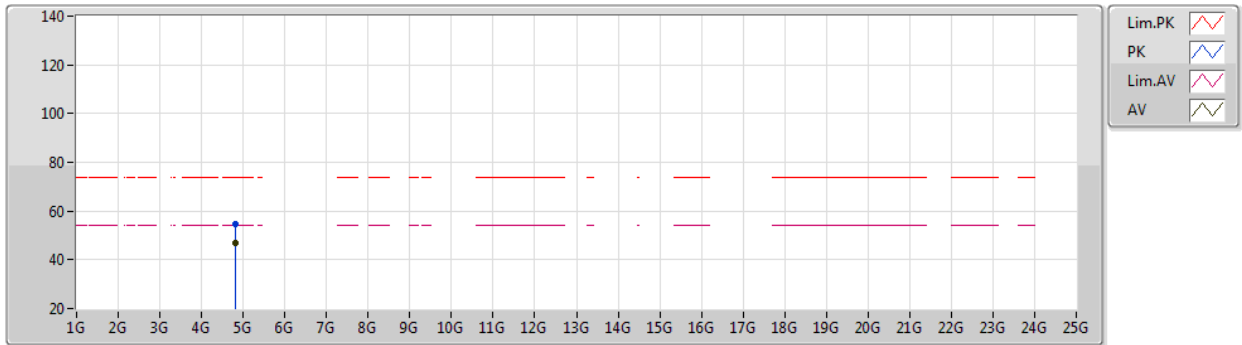


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	4.80392G	42.76	54.00	-11.24	6.97	3	Vertical	114	2.27	-	35.79	31.10	9.92	34.05
PK	4.80351G	51.73	74.00	-22.27	6.97	3	Vertical	114	2.27	-	44.76	31.10	9.92	34.05

BT-LE(1Mbps)

2402MHz_TX

20/01/2020

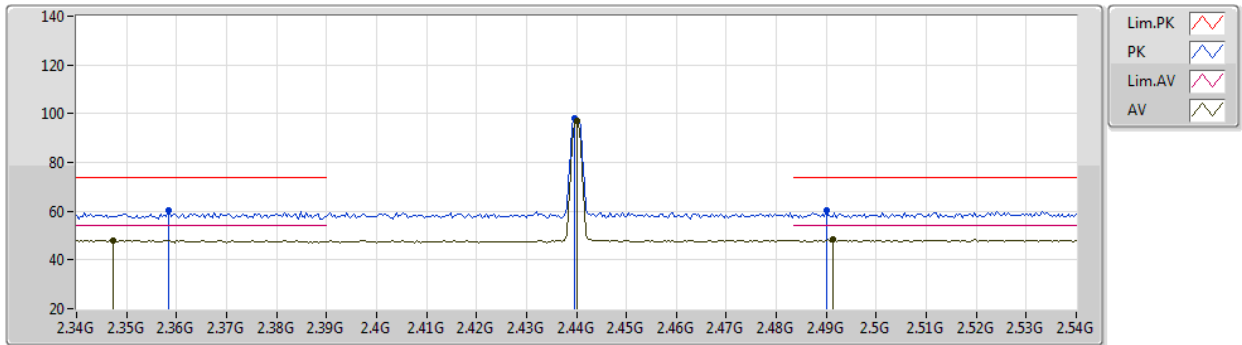


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	4.80399G	46.73	54.00	-7.27	6.97	3	Horizontal	118	3.00	-	39.76	31.10	9.92	34.05
PK	4.80448G	54.56	74.00	-19.44	6.97	3	Horizontal	118	3.00	-	47.59	31.10	9.92	34.05

BT-LE(1Mbps)

2440MHz_TX

20/01/2020

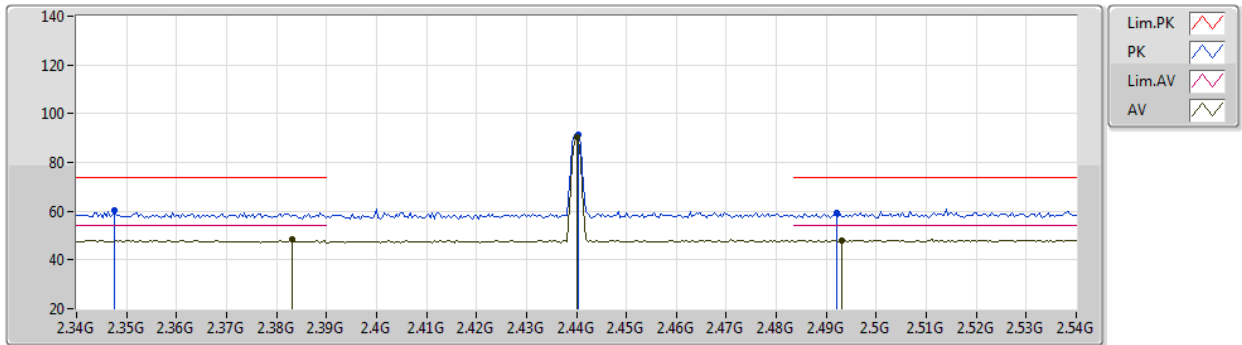


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	2.3472G	48.16	54.00	-5.84	35.15	3	Vertical	38	2.95	-	13.01	27.81	7.34	-
AV	2.44G	97.26	Inf	-Inf	34.91	3	Vertical	38	2.95	-	62.35	27.56	7.35	-
AV	2.4912G	48.30	54.00	-5.70	34.88	3	Vertical	38	2.95	-	13.42	27.51	7.37	-
PK	2.3584G	60.37	74.00	-13.63	35.11	3	Vertical	38	2.95	-	25.26	27.77	7.34	-
PK	2.4396G	98.24	Inf	-Inf	34.91	3	Vertical	38	2.95	-	63.33	27.56	7.35	-
PK	2.49G	60.24	74.00	-13.76	34.88	3	Vertical	38	2.95	-	25.36	27.51	7.37	-

BT-LE(1Mbps)

2440MHz_TX

20/01/2020

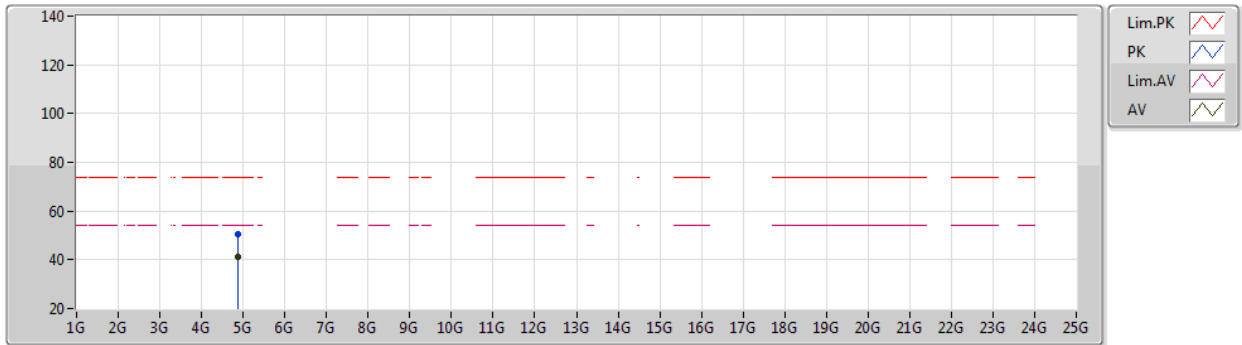


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	2.3832G	48.33	54.00	-5.67	35.00	3	Horizontal	52	2.85	-	13.33	27.67	7.33	-
AV	2.44G	90.10	Inf	-Inf	34.91	3	Horizontal	52	2.85	-	55.19	27.56	7.35	-
AV	2.4932G	48.10	54.00	-5.90	34.88	3	Horizontal	52	2.85	-	13.22	27.51	7.37	-
PK	2.3476G	60.42	74.00	-13.58	35.15	3	Horizontal	52	2.85	-	25.27	27.81	7.34	-
PK	2.4404G	91.19	Inf	-Inf	34.91	3	Horizontal	52	2.85	-	56.28	27.56	7.35	-
PK	2.492G	59.54	74.00	-14.46	34.88	3	Horizontal	52	2.85	-	24.66	27.51	7.37	-

BT-LE(1Mbps)

20/01/2020

2440MHz_TX

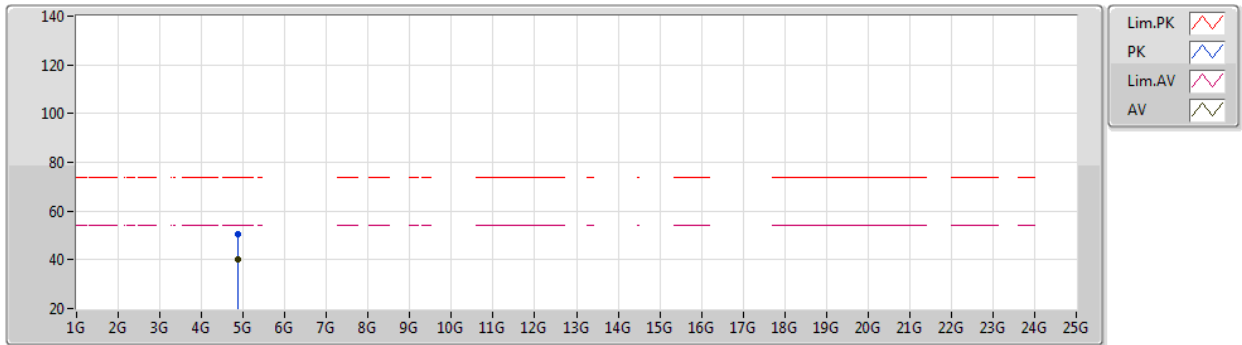


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	4.88004G	41.34	54.00	-12.66	7.03	3	Vertical	121	2.33	-	34.31	31.10	9.98	34.05
PK	4.87959G	50.68	74.00	-23.32	7.03	3	Vertical	121	2.33	-	43.65	31.10	9.98	34.05

BT-LE(1Mbps)

20/01/2020

2440MHz_TX

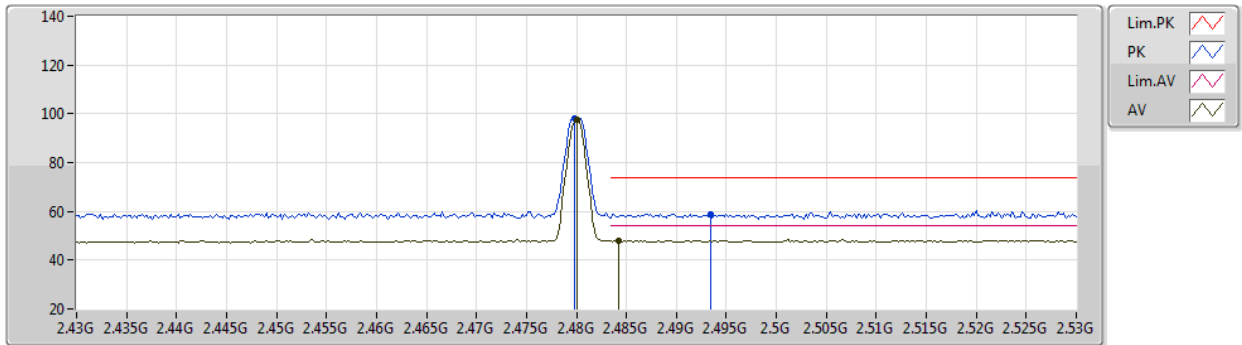


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	4.87964G	40.01	54.00	-13.99	7.03	3	Horizontal	99	1.29	-	32.98	31.10	9.98	34.05
PK	4.87942G	50.49	74.00	-23.51	7.03	3	Horizontal	99	1.29	-	43.46	31.10	9.98	34.05

BT-LE(1Mbps)

2480MHz_TX

20/01/2020

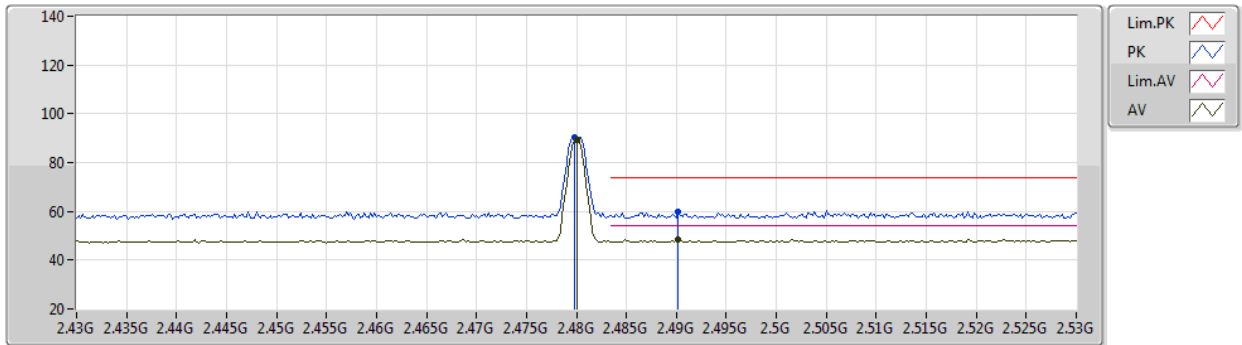


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	2.48G	97.35	Inf	-Inf	34.89	3	Vertical	40	2.95	-	62.46	27.52	7.37	-
AV	2.4842G	48.06	54.00	-5.94	34.89	3	Vertical	40	2.95	-	13.17	27.52	7.37	-
PK	2.4798G	98.31	Inf	-Inf	34.88	3	Vertical	40	2.95	-	63.43	27.52	7.36	-
PK	2.4934G	58.98	74.00	-15.02	34.88	3	Vertical	40	2.95	-	24.10	27.51	7.37	-

BT-LE(1Mbps)

2480MHz_TX

20/01/2020

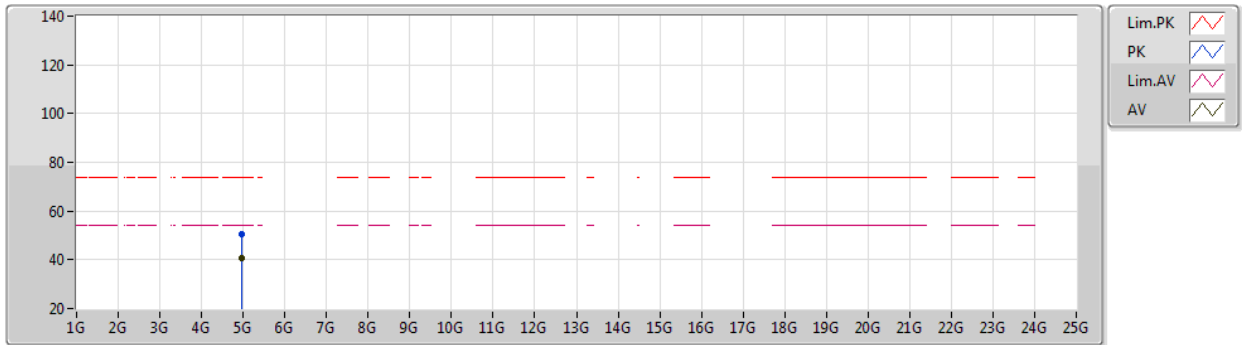


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	2.48G	89.45	Inf	-Inf	34.89	3	Horizontal	159	1.00	-	54.56	27.52	7.37	-
AV	2.4902G	48.53	54.00	-5.47	34.88	3	Horizontal	159	1.00	-	13.65	27.51	7.37	-
PK	2.4798G	90.45	Inf	-Inf	34.88	3	Horizontal	159	1.00	-	55.57	27.52	7.36	-
PK	2.4902G	59.59	74.00	-14.41	34.88	3	Horizontal	159	1.00	-	24.71	27.51	7.37	-

BT-LE(1Mbps)

20/01/2020

2480MHz_TX

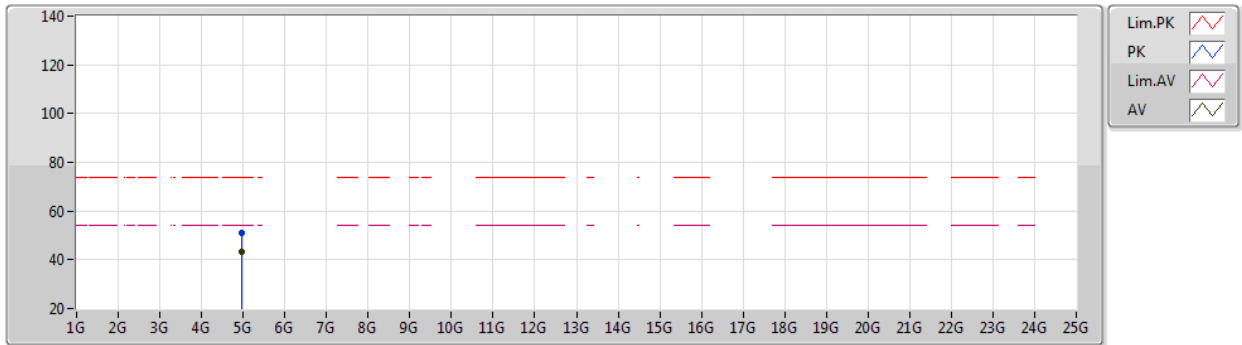


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	4.95997G	40.93	54.00	-13.07	7.35	3	Vertical	118	2.27	-	33.58	31.34	10.05	34.04
PK	4.95943G	50.67	74.00	-23.33	7.35	3	Vertical	118	2.27	-	43.32	31.34	10.05	34.04

BT-LE(1Mbps)

20/01/2020

2480MHz_TX

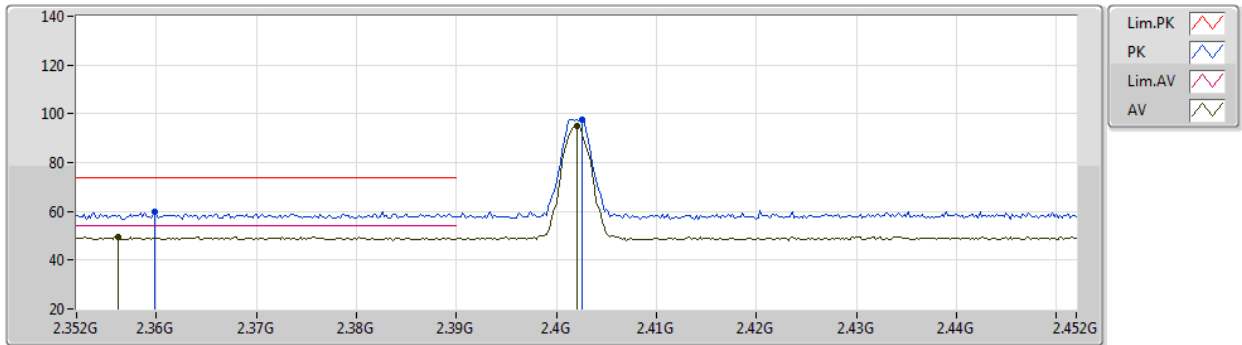


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	4.96G	43.36	54.00	-10.64	7.35	3	Horizontal	111	3.00	-	36.01	31.34	10.05	34.04
PK	4.96054G	51.18	74.00	-22.82	7.35	3	Horizontal	111	3.00	-	43.83	31.34	10.05	34.04

BT-LE(2Mbps)

2402MHz_TX

20/01/2020

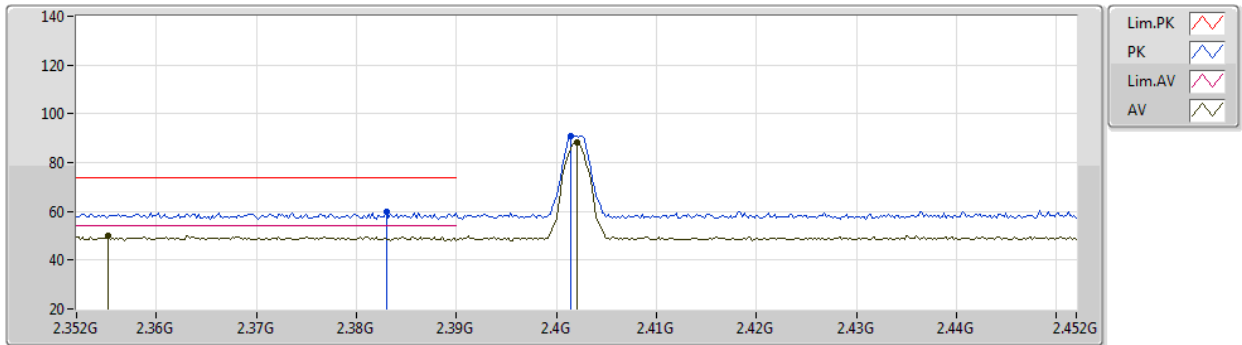


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	2.3562G	49.68	54.00	-4.32	35.12	3	Vertical	38	3.00	-	14.56	27.78	7.34	-
AV	2.402G	95.22	Inf	-Inf	34.93	3	Vertical	38	3.00	-	60.29	27.60	7.33	-
PK	2.3598G	59.77	74.00	-14.23	35.10	3	Vertical	38	3.00	-	24.67	27.76	7.34	-
PK	2.4026G	97.63	Inf	-Inf	34.93	3	Vertical	38	3.00	-	62.70	27.60	7.33	-

BT-LE(2Mbps)

2402MHz_TX

20/01/2020

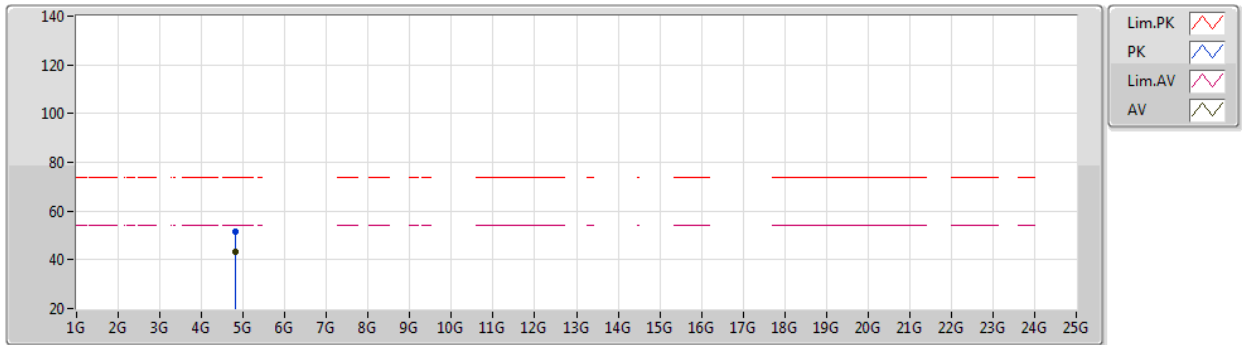


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	2.3552G	49.88	54.00	-4.12	35.12	3	Horizontal	153	2.91	-	14.76	27.78	7.34	-
AV	2.402G	88.45	Inf	-Inf	34.93	3	Horizontal	153	2.91	-	53.52	27.60	7.33	-
PK	2.383G	59.60	74.00	-14.40	35.00	3	Horizontal	153	2.91	-	24.60	27.67	7.33	-
PK	2.4014G	90.89	Inf	-Inf	34.93	3	Horizontal	153	2.91	-	55.96	27.60	7.33	-

BT-LE(2Mbps)

20/01/2020

2402MHz_TX

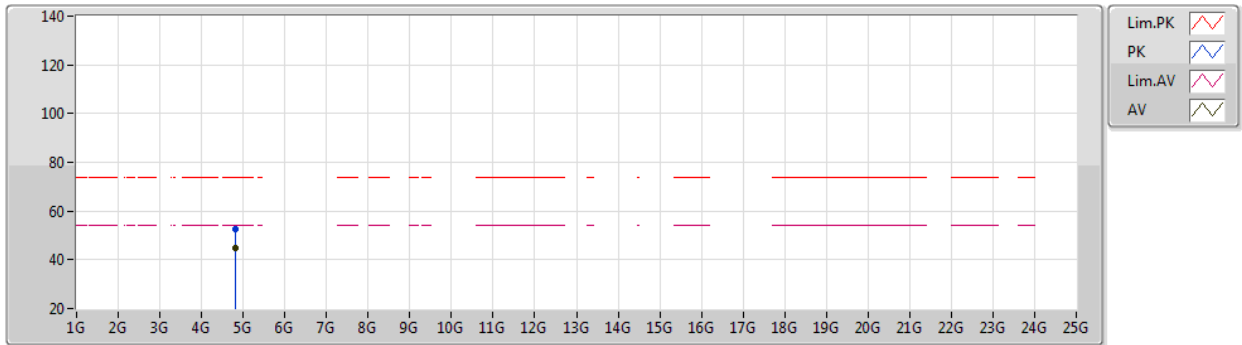


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	4.80286G	43.17	54.00	-10.83	6.97	3	Vertical	116	2.96	-	36.20	31.10	9.92	34.05
PK	4.80514G	51.75	74.00	-22.25	6.97	3	Vertical	116	2.96	-	44.78	31.10	9.92	34.05

BT-LE(2Mbps)

20/01/2020

2402MHz_TX

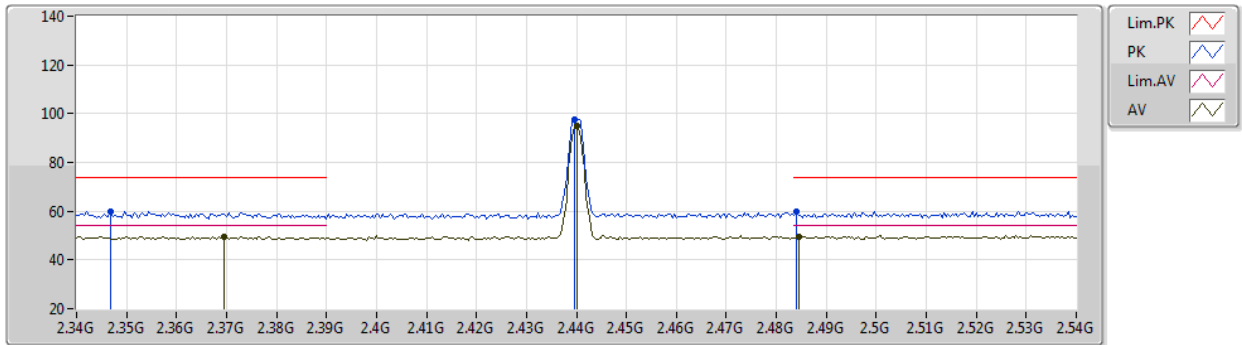


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	4.80294G	45.03	54.00	-8.97	6.97	3	Horizontal	99	1.02	-	38.06	31.10	9.92	34.05
PK	4.80291G	52.51	74.00	-21.49	6.97	3	Horizontal	99	1.02	-	45.54	31.10	9.92	34.05

BT-LE(2Mbps)

2440MHz_TX

20/01/2020

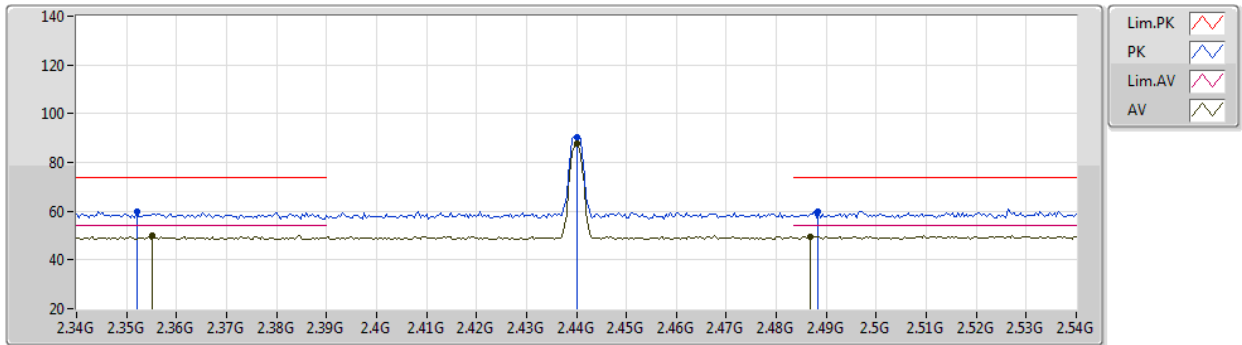


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	2.3696G	49.55	54.00	-4.45	35.06	3	Vertical	36	3.00	-	14.49	27.72	7.34	-
AV	2.44G	95.12	Inf	-Inf	34.91	3	Vertical	36	3.00	-	60.21	27.56	7.35	-
AV	2.4844G	49.66	54.00	-4.34	34.89	3	Vertical	36	3.00	-	14.77	27.52	7.37	-
PK	2.3468G	59.81	74.00	-14.19	35.15	3	Vertical	36	3.00	-	24.66	27.81	7.34	-
PK	2.4396G	97.46	Inf	-Inf	34.91	3	Vertical	36	3.00	-	62.55	27.56	7.35	-
PK	2.484G	59.91	74.00	-14.09	34.89	3	Vertical	36	3.00	-	25.02	27.52	7.37	-

BT-LE(2Mbps)

20/01/2020

2440MHz_TX

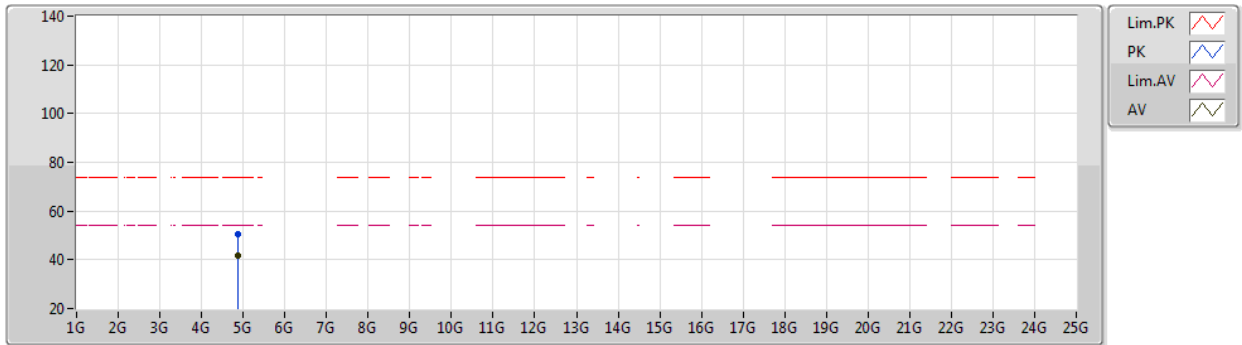


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
AV	2.3552G	49.83	54.00	-4.17	35.12	3	Horizontal	159	1.11	-	14.71	27.78	7.34	-
AV	2.44G	87.79	Inf	-Inf	34.91	3	Horizontal	159	1.11	-	52.88	27.56	7.35	-
AV	2.4868G	49.50	54.00	-4.50	34.88	3	Horizontal	159	1.11	-	14.62	27.51	7.37	-
PK	2.352G	59.64	74.00	-14.36	35.13	3	Horizontal	159	1.11	-	24.51	27.79	7.34	-
PK	2.44G	90.21	Inf	-Inf	34.91	3	Horizontal	159	1.11	-	55.30	27.56	7.35	-
PK	2.4884G	60.07	74.00	-13.93	34.88	3	Horizontal	159	1.11	-	25.19	27.51	7.37	-

BT-LE(2Mbps)

2440MHz_TX

20/01/2020

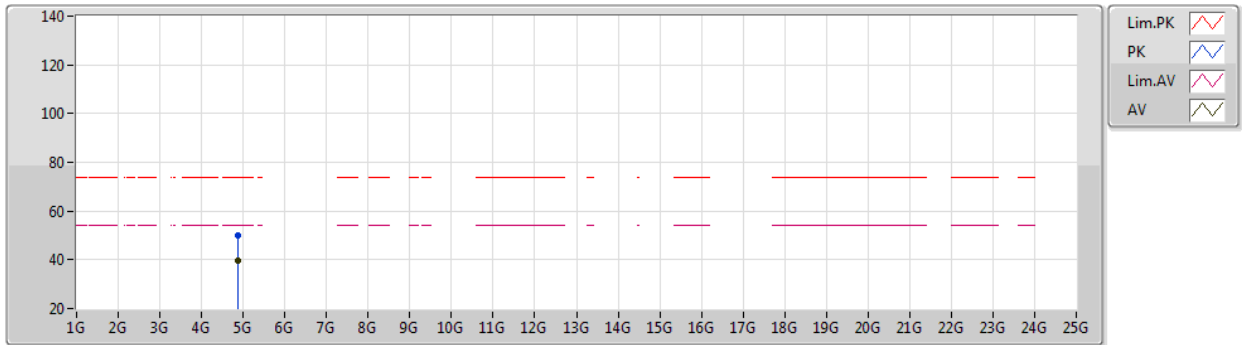


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	4.88G	41.94	54.00	-12.06	7.03	3	Vertical	116	2.33	-	34.91	31.10	9.98	34.05
PK	4.87887G	50.34	74.00	-23.66	7.03	3	Vertical	116	2.33	-	43.31	31.10	9.98	34.05

BT-LE(2Mbps)

20/01/2020

2440MHz_TX

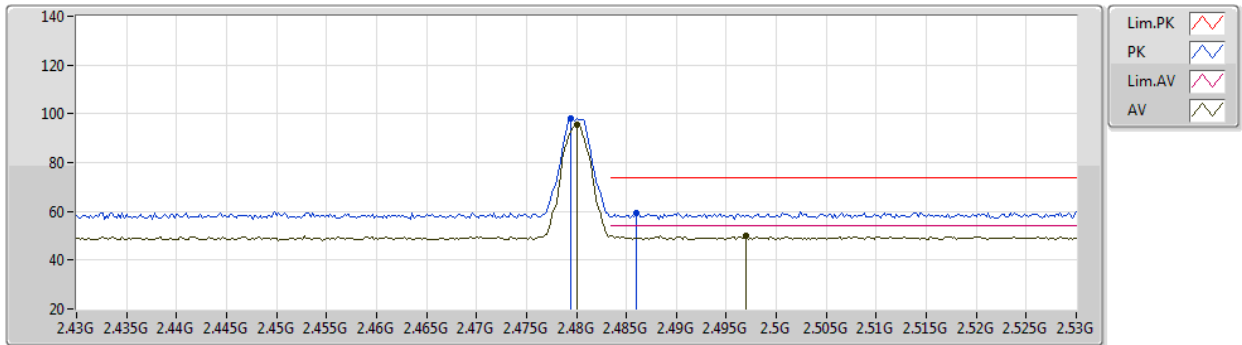


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	4.88016G	39.43	54.00	-14.57	7.03	3	Horizontal	95	1.01	-	32.40	31.10	9.98	34.05
PK	4.88092G	49.91	74.00	-24.09	7.03	3	Horizontal	95	1.01	-	42.88	31.10	9.98	34.05

BT-LE(2Mbps)

2480MHz_TX

20/01/2020

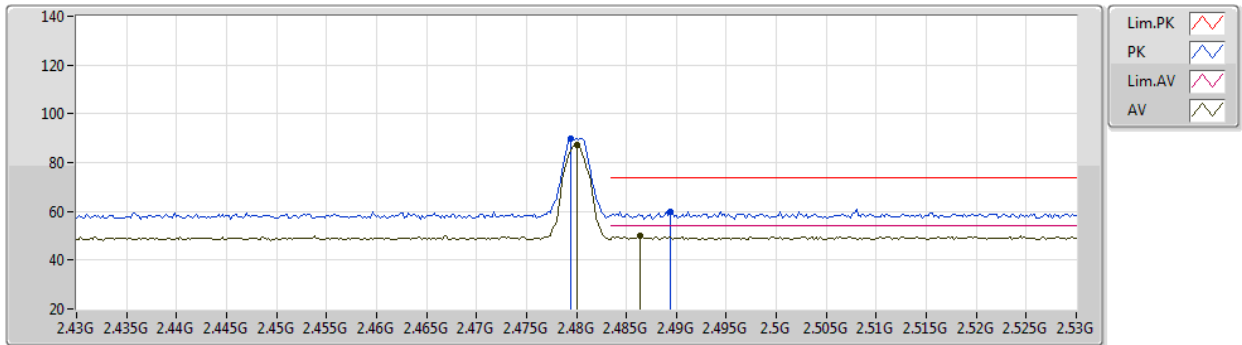


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	2.48G	95.57	Inf	-Inf	34.89	3	Vertical	37	2.87	-	60.68	27.52	7.37	-
AV	2.497G	49.98	54.00	-4.02	34.87	3	Vertical	37	2.87	-	15.11	27.50	7.37	-
PK	2.4794G	97.91	Inf	-Inf	34.88	3	Vertical	37	2.87	-	63.03	27.52	7.36	-
PK	2.486G	59.47	74.00	-14.53	34.88	3	Vertical	37	2.87	-	24.59	27.51	7.37	-

BT-LE(2Mbps)

2480MHz_TX

20/01/2020

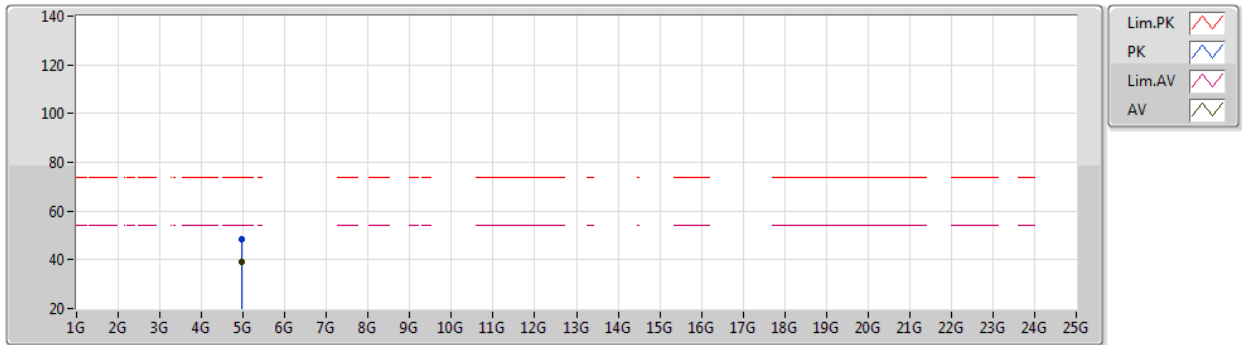


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	2.48G	87.31	Inf	-Inf	34.89	3	Horizontal	157	1.00	-	52.42	27.52	7.37	-
AV	2.4864G	49.82	54.00	-4.18	34.88	3	Horizontal	157	1.00	-	14.94	27.51	7.37	-
PK	2.4794G	89.79	Inf	-Inf	34.88	3	Horizontal	157	1.00	-	54.91	27.52	7.36	-
PK	2.4894G	59.93	74.00	-14.07	34.88	3	Horizontal	157	1.00	-	25.05	27.51	7.37	-

BT-LE(2Mbps)

20/01/2020

2480MHz_TX

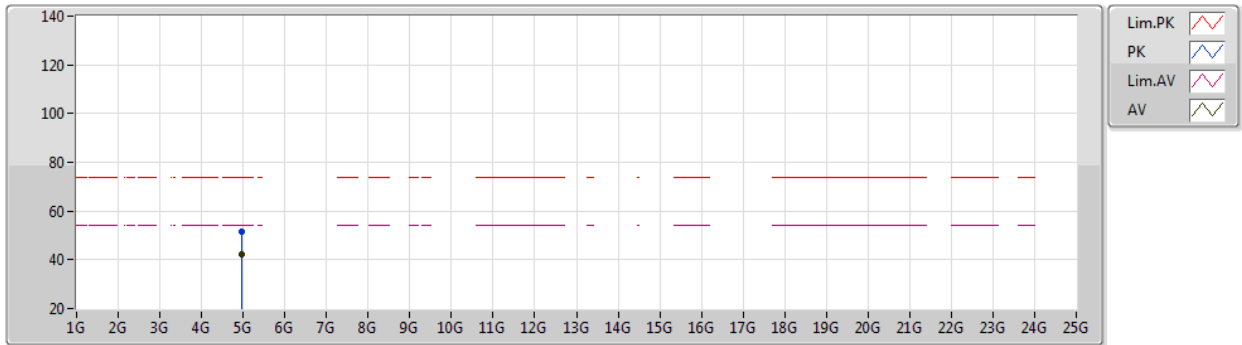


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	4.95902G	38.95	54.00	-15.05	7.35	3	Vertical	121	1.48	-	31.60	31.34	10.05	34.04
PK	4.95908G	48.48	74.00	-25.52	7.35	3	Vertical	121	1.48	-	41.13	31.34	10.05	34.04

BT-LE(2Mbps)

20/01/2020

2480MHz_TX



Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	4.9589G	42.48	54.00	-11.52	7.34	3	Horizontal	111	3.00	-	35.14	31.34	10.04	34.04
PK	4.96086G	51.31	74.00	-22.69	7.35	3	Horizontal	111	3.00	-	43.96	31.34	10.05	34.04