FCC Test Report

FCC ID	:	**2AEUPBHALP012**
Equipment	:	**Video Doorbell Pro**
Brand Name	:	**RING LLC**
Model Name	:	**Video Doorbell Pro**
Applicant	:	**Ring LLC** **1523 26th St, Santa Monica, CA 90404, USA**
Manufacturer	:	**Chicony Electronics Co., Ltd** **36F., No.69, Sec. 2, Guangfu Rd., Sanchong Dist.,** **New Taipei City 241, Taiwan (R.O.C.)**
Standard	:	**47 CFR FCC Part 15.247**

The product was received on May 06, 2020, and testing was started from May 07, 2020 and completed on Jul. 03, 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 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

Report No.	Version	Description	Issued Date
FR042505AL	01	Initial issue of report	Nov. 25, 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	-

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: Debby Hung

1 General Description

1.1 Information

1.1.1 RF General Information

Frequency Range (MHz)	Bluetooth Mode	Ch. Frequency (MHz)	Channel Number
2400-2483.5	LE	2402-2480	0-39 [40]

Band	Mode	BWch (MHz)	Nant
2.4-2.4835GHz	BT-LE(1Mbps)	1.0	1TX

Note:
- Bluetooth LE uses a GFSK (1Mbps) modulation.
- BWch is the nominal channel bandwidth.

1.1.2 Antenna Information

Ant.	Port	Brand	Model Name	Antenna Type	Connector
1	1	-	Ring Wifi Antenna	PIFA Antenna	Fixed on board

2.4G		5G		BT	
Frequency (MHz)	Gain (dBi)	Frequency (MHz)	Gain (dBi)	Frequency (MHz)	Gain (dBi)
2412	1.37	5180	1.4	2402	1.37
2417	1.37	5190	1.4	2440 / 2441	1.08
2422	1.37	5200	1.4	2480	1.09
2427	1.08	5230	2.5	-	-
2432	1.08	5240	2.5	-	-
2437	1.08	5250	2.93	-	-
2442	1.08	5260	2.93	-	-
2447	1.08	5270	2.93	-	-
2452	1.08	5280	2.93		
2457	1.08	5310	2.45	-	-
2462	1.08	5320	2.45	-	-
-	-	5350	2.45	-	-
-	-	5470	2.75	-	-
-	-	5500	2.75	-	-
-	-	5510	2.75	-	-
-	-	5600	2.79	-	-
-	-	5670	2.52	-	-
-	-	5700	2.52	-	-
-	-	5725	2.52	-	-
-	-	5745	3.12	-	-
-	-	5755	3.12	-	-
-	-	5785	2.65	-	-
-	-	5795	2.65	-	-
-	-	5825	1.67	-	-

For 2.4 GHz function:
For IEEE 802.11b/g/n mode (1TX/1RX)
Only Ant. 1 (port 1) can be used as transmitting/receiving antenna.
For 5 GHz function:
For IEEE 802.11a/n mode (1TX/1RX)
Only Ant. 1 (port 1) can be used as transmitting/receiving antenna.
For Bluetooth function:
For Bluetooth mode (1TX/1RX)
Only Ant. 1 (port 1) can be used as transmitting/receiving antenna.

1.1.3 EUT Information

Operational Condition				
EUT Power Type	From Battery / Transformer			
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)	0.636	1.97	403.125u	3k

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

The following reference test guidance is not within the scope of accreditation of TAF:

- 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	21.3~24.4°C / 68~71%	22/May/2020
RF Conducted	TH06-HY	Raven	22.8~24.3°C / 53~68%	07/May/2020~03/Jul/2020
Radiated <Below 1G>	03CH09-HY	Lego	21.4~21.8°C / 59~66%	20/May/2020
Radiated <Above 1G>	03CH02-HY	Lego	21.6~22.1°C / 58~63%	16/May/2020~01/Jun/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)	0.9 dB	Confidence levels of 95%
Radiated Emission (9kHz ~ 30MHz)	2.4 dB	Confidence levels of 95%
Radiated Emission (30MHz ~ 1,000MHz)	3.7 dB	Confidence levels of 95%
Radiated Emission (1GHz ~ 18GHz)	3.6 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	3.5 dB	Confidence levels of 95%
Conducted Emission	1.0 dB	Confidence levels of 95%
Temperature	0.41 °C	Confidence levels of 95%
Humidity	3.4 %	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	Microsoft Windows v6.1

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

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	Transformer 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	Transformer mode		
Operating Mode > 1GHz	CTX		
Orthogonal Planes of EUT	**X Plane**	**Y Plane**	**Z Plane**
			
Worst Planes of EUT		V	

2.4 Accessories

Accessories				
Battery	Brand Name	Fellotech	Model Name	FT602025P
	Power Rating	3.7 Vdc, 240mAh	Type	Li-Po

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

2.5 Support Equipment

Support Equipment – AC Conduction and Radiated					
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**	**Remark**
1	Transformer	TRIAD	VPL16-1600	-	-

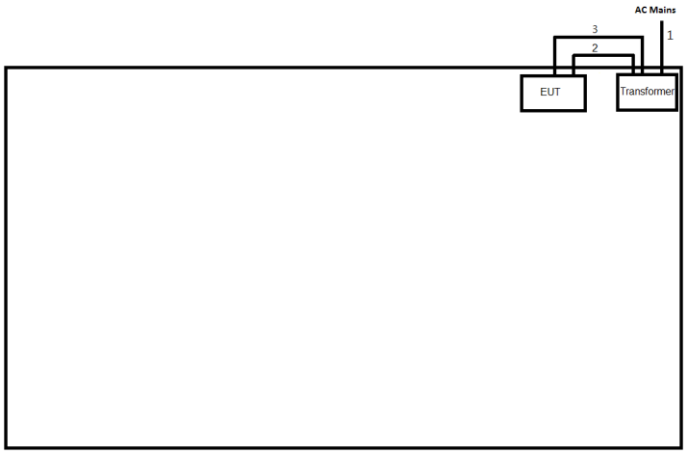
Note.Support equipment No.1 was provided by customer.

Support Equipment – Conducted					
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**	**Remark**
1	Notebook	DELL	E5410	-	-
2	Adapter for NB	DELL	HA65NM130	-	-
3	Transformer	TRIAD	VPL16-1600	-	-

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

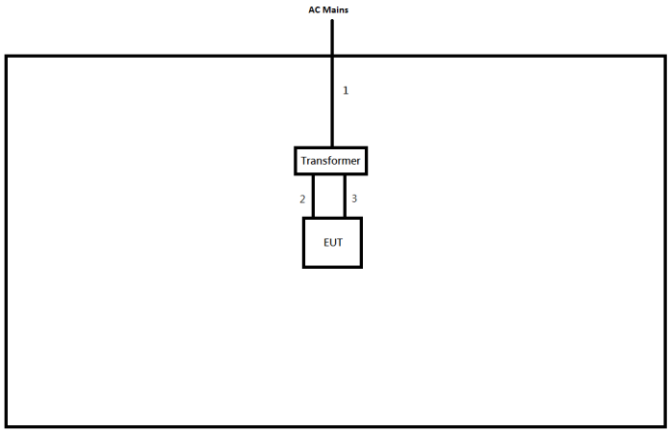
2.6 Test Setup Diagram

Test Setup Diagram – AC Line Conducted Emission Test



Item	Connection	Shielded	Length(m)	Remark
1	AC Power cable	No	1.5	-
2	DC Power cable(+)	No	0.15	-
3	DC Power cable(-)	No	0.15	-

Test Setup Diagram - Radiated Test



Item	Connection	Shielded	Length(m)	Remark
1	AC Power cable	No	1.8	-
2	DC Power cable(+)	No	0.15	-
3	DC Power cable(-)	No	0.15	-

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

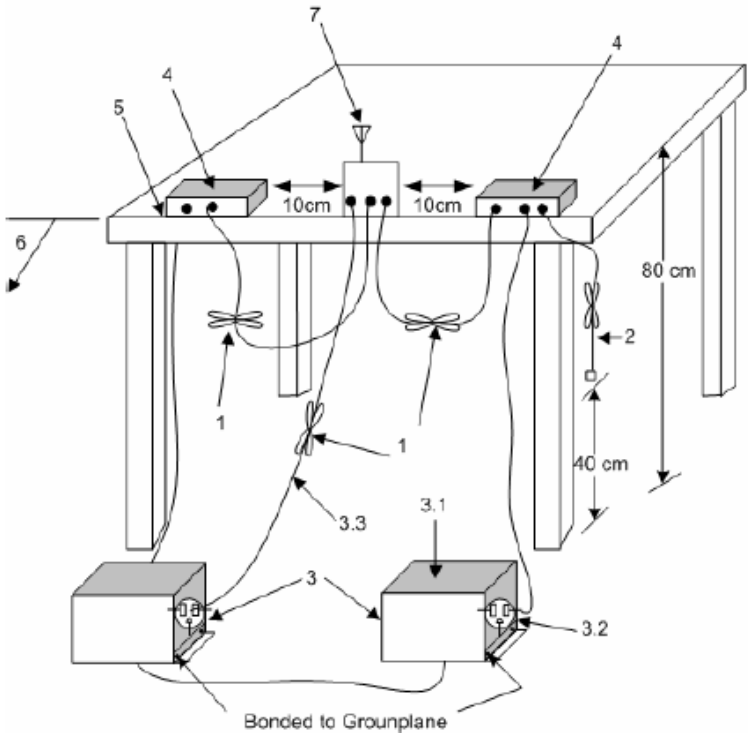
Test Method
▪ Refer as ANSI C63.10-2013, clause 6.2 foray power-line conducted emissions.

3.1.4 Measurement Results Calculation

The measured Level is calculated using:
Corrected Reading: Raw(Read Level) +LISN(LISN Factor) + CL(Cable Loss) + AT(Attenuator).

3.1.5 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.

3.1.6 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

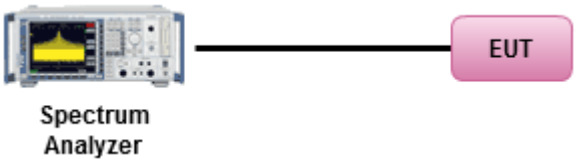
Refer a test equipment and calibration data table in this test report.

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 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

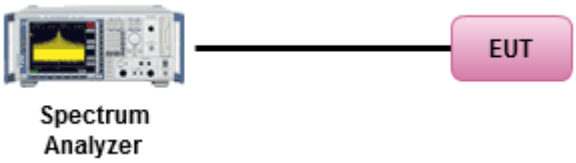
3.4.2 Measuring Instruments

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) Max. PSD.	
▪ For conducted measurement.		
	▪ If The EUT supports multiple transmit chains using options given below:	
		▪ Measure and sum the spectra across the outputs. Refer as KDB 662911, In-band power spectral density (PSD). Sample all transmit ports simultaneously using a spectrum analyzer for each transmit port. Where the trace bin-by-bin of each transmit port summing can be performed. (i.e., in the first spectral bin of output 1 is summed with that in the first spectral bin of output 2 and that from the first spectral bin of output 3, and so on up to the NTX output to obtain the value for the first frequency bin of the summed spectrum.). Add up the amplitude (power) values for the different transmit chains and use this as the new data trace.

3.4.4 Test Setup

Power Spectral Density


3.4.5 Test Result of Power Spectral Density

Refer as Appendix D

3.5 Emissions in Non-restricted Frequency Bands

3.5.1 Emissions in Non-restricted Frequency Bands Limit

Un-restricted Band Emissions Limit	
RF output power procedure	**Limit (dB)**
Peak output power procedure	20
Average output power procedure	30
Note 1: If the peak output power procedure is used to measure the fundamental emission power to demonstrate compliance to requirements, then the peak conducted output power measured within any 100 kHz outside the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum measured in-band peak 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.	

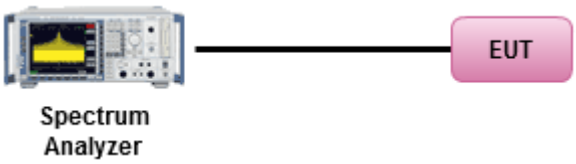
3.5.2 Measuring Instruments

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.

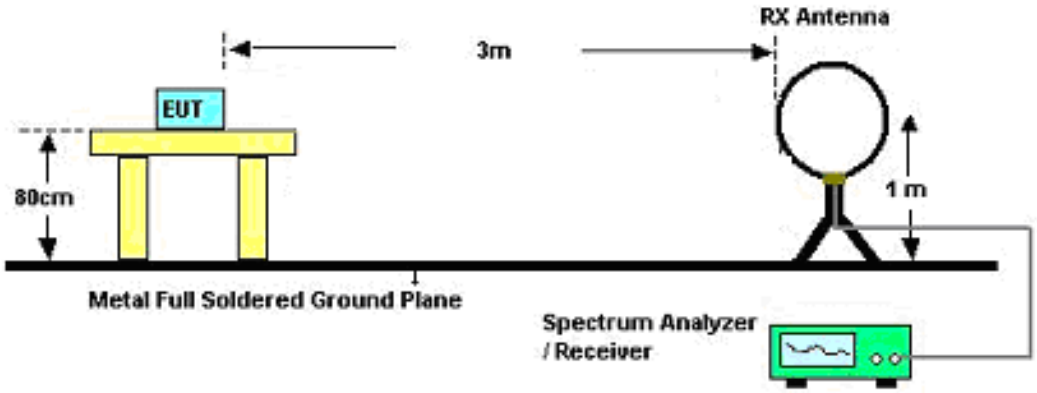
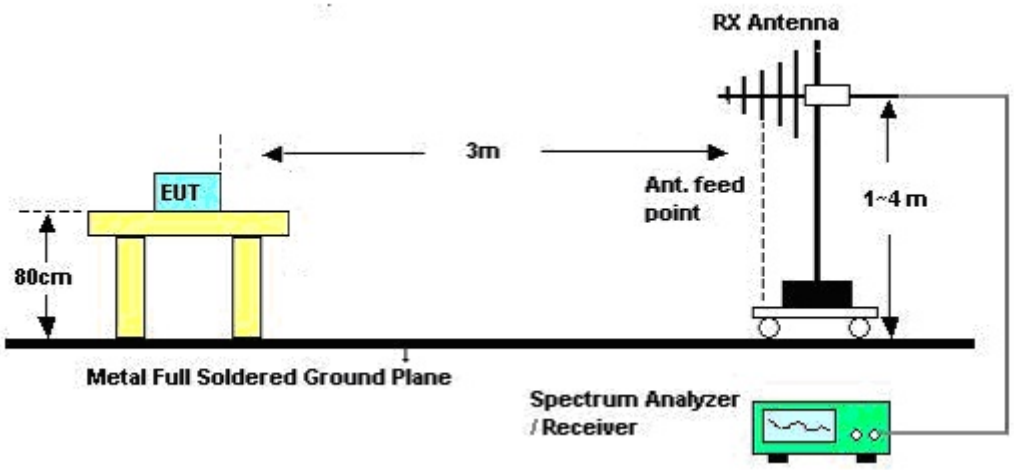
3.6.3 Test Procedures

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.

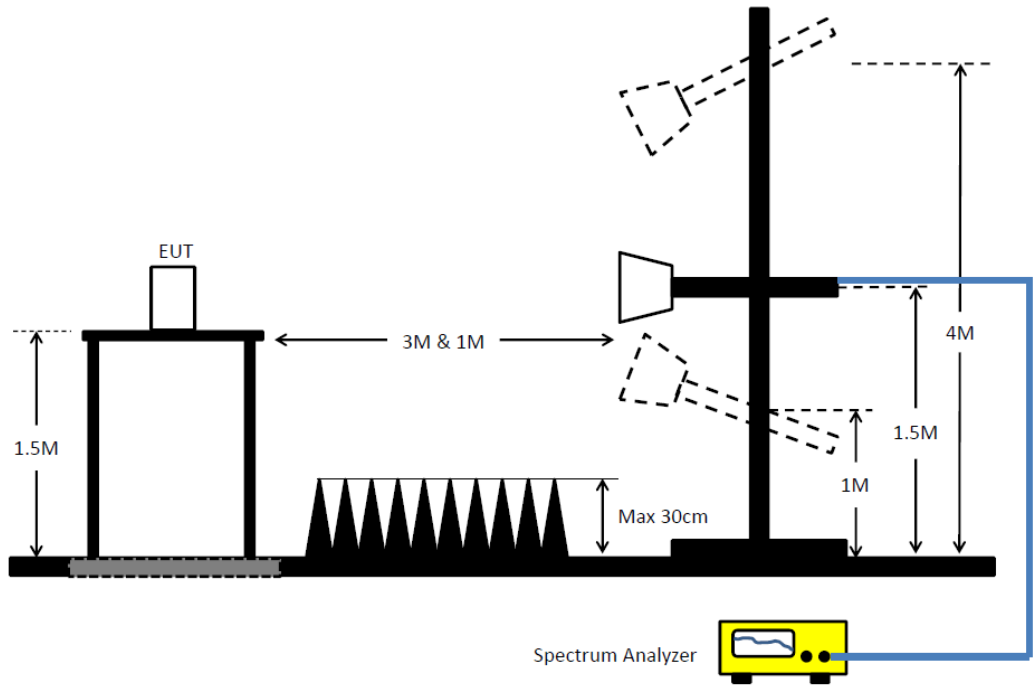
3.6.4 Measurement Results Calculation

The measured Level is calculated using:
Corrected Reading: Raw(Read Level) + AF(Antenna Factor) + CL(Cable Loss) - PA(Preamp Factor)

3.6.5 Test Setup

Emissions in Restricted Frequency Bands
9kHz ~30MHz

30MHz~1GHz


Above 1GHz



3.6.6 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.

3.6.7 Test Result of Emissions in Restricted Frequency Bands

Refer as Appendix F

4 Test Equipment and Calibration Data

Instrument for AC Conduction

Instrument	Manufacturer	Model No.	Serial No.	Spec.	Calibration Date	Calibration Due Date
EMC Receiver	R&S	ESR3	102051	9kHz ~ 3.6GHz	28/May/2019	27/May/2020
LISN	R&S	ENV216	101295	9kHz ~ 30MHz	05/Nov/2019	04/Nov/2020
RF Cable-CON	MTJ	RG142	CB002-CO	9kHz ~ 200MHz	23/Sep/2019	22/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
Signal Analyzer	R&S	FSV 40	101029	10KHz ~ 40GHz	01/Oct/2019	30/Sep/2020
SMB100A Signal Generator	R&S	SMB100A03	181147	100kHz~40GHz	12/Nov/2018	11/Nov/2020
Pulse Sensor	Anritsu	MA2411B	1027452	300MHz~40GHz	18/Mar/2020	17/Mar/2021
Power Meter	Anritsu	ML2495A	1124009	300MHz~40GHz	18/Mar/2020	17/Mar/2021

Instrument for Radiated Test (03CH02-HY)

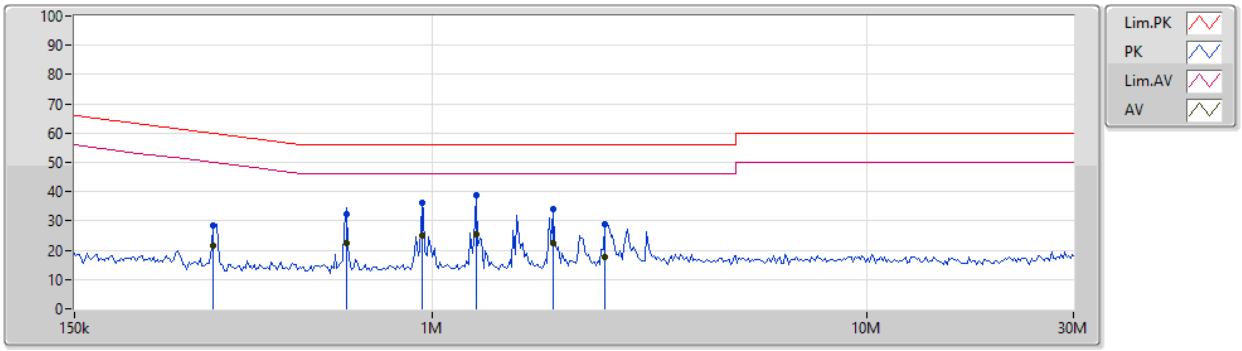
Instrument	Manufacturer	Model No.	Serial No.	Spec.	Calibration Date	Calibration Due Date
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH02-HY	1GHz ~ 18GHz 3m	29/Aug/2019	28/Aug/2020
Microwave Preamplifier	Agilent	8449B	3008A02373	1GHz ~ 26.5GHz	16/Oct/2019	15/Oct/2020
Spectrum Analyzer	Rohde & Schwarz	FSP40	100593	9KHz - 40GHz	27/Feb/2020	26/Feb/2021
RF Cable-high	SUHNER	SUCOFLEX104	805193/4+ 805192/4	1GHz~40GHz	08/Apr/2020	07/Apr/2021
Broadband Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA 9170221	18GHz~40GHz	13/Mar/2020	12/Mar/2021
Double Ridged Guide Horn Antenna	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 01543	1GHz ~ 18GHz	03/Jun/2019	02/Jun/2020
Preamplifier	MITEQ	TTA1840-35-HG	1864481	18GHz ~ 40GHz	10/Mar/2020	09/Mar/2021

Instrument for Radiated Test (03CH09-HY)

Instrument	Manufacturer	Model No.	Serial No.	Spec.	Calibration Date	Calibration Due Date
3m Semi Anechoic Chamber	TDK	SAC-3M	03CH09-HY	30MHz~1GHz	27/Mar/2020	26/Mar/2021
Amplifier	EMC	EMC9135	980232	9kHz~1GHz	14/Apr/2020	13/Apr/2021
EMC Receiver	R&S	ESR3	102051	9kHz ~ 3.6GHz	28/May/2019	27/May/2020
EXA Signal Analyzer	KEYSIGHT	N9010A	MY54200885	10Hz~44GHz	07/Aug/2019	06/Aug/2020
Bilog Antenna & 5dB Attenuator	TESEQ & MTJ	CBL6111D & MTJ6102-05	35418 / 3	30MHz~1GHz	30/Sep/2019	29/Sep/2020
Loop Antenna	TESEQ	HLA 6120	31244	9kHz-30MHz	16/Mar/2020	15/Mar/2021
RF Cable-low	Jye Bao	RG142	CB031+324530/4	9kHz~1GHz	12/Feb/2020	11/Feb/2021

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

22/05/2020



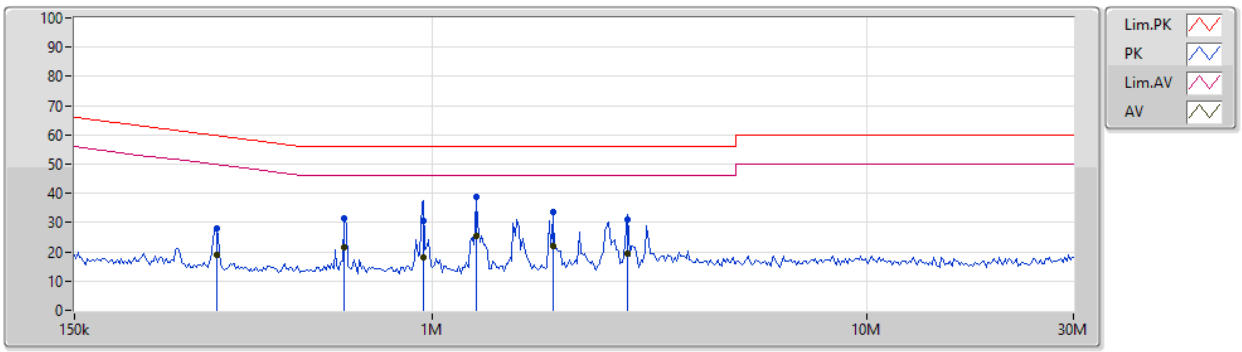
Type	Freq	Level	Limit	Margin	Factor	Condition	Comment	Raw	LISN	CL	AT
	(Hz)	(dBuV)	(dBuV)	(dB)	(dB)			(dBuV)	(dB)	(dB)	(dB)
QP	313.237k	28.27	59.88	-31.61	19.62	Neutral	-	8.65	9.63	0.12	9.87
AV	313.237k	21.50	49.88	-28.38	19.62	Neutral	-	1.88	9.63	0.12	9.87
QP	634.878k	32.36	56.00	-23.64	19.62	Neutral	-	12.74	9.63	0.12	9.87
AV	634.878k	22.34	46.00	-23.66	19.62	Neutral	-	2.72	9.63	0.12	9.87
QP	945.247k	36.40	56.00	-19.60	19.62	Neutral	-	16.78	9.63	0.11	9.88
AV	945.247k	25.15	46.00	-20.85	19.62	Neutral	-	5.53	9.63	0.11	9.88
QP	1.261M	38.77	56.00	-17.23	19.64	Neutral	"Worst"	19.13	9.64	0.12	9.88
AV	1.261M	25.37	46.00	-20.63	19.64	Neutral	-	5.73	9.64	0.12	9.88
QP	1.897M	34.05	56.00	-21.95	19.67	Neutral	-	14.38	9.65	0.15	9.87
AV	1.897M	22.30	46.00	-23.70	19.67	Neutral	-	2.63	9.65	0.15	9.87
QP	2.506M	29.02	56.00	-26.98	19.68	Neutral	-	9.34	9.65	0.16	9.87
AV	2.506M	17.62	46.00	-28.38	19.68	Neutral	-	-2.06	9.65	0.16	9.87

Remark :

Level (dBuV/m) = Raw(Read Level) +LISN(LISN Factor) + CL(Cable Loss) +AT(Attenuator)

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

22/05/2020



Type	Freq	Level	Limit	Margin	Factor	Condition	Comment	Raw	LISN	CL	AT
	(Hz)	(dBuV)	(dBuV)	(dB)	(dB)			(dBuV)	(dB)	(dB)	(dB)
QP	319.533k	27.97	59.71	-31.74	19.63	Line	-	8.34	9.64	0.12	9.87
AV	319.533k	18.77	49.71	-30.94	19.63	Line	-	-0.86	9.64	0.12	9.87
QP	628.592k	31.26	56.00	-24.74	19.63	Line	-	11.63	9.64	0.12	9.87
AV	628.592k	21.43	46.00	-24.57	19.63	Line	-	1.80	9.64	0.12	9.87
QP	954.7k	30.58	56.00	-25.42	19.63	Line	-	10.95	9.64	0.11	9.88
AV	954.7k	17.95	46.00	-28.05	19.63	Line	-	-1.68	9.64	0.11	9.88
QP	1.261M	38.58	56.00	-17.42	19.64	Line	"Worst"	18.94	9.64	0.12	9.88
AV	1.261M	25.38	46.00	-20.62	19.64	Line	-	5.74	9.64	0.12	9.88
QP	1.897M	33.54	56.00	-22.46	19.67	Line	-	13.87	9.65	0.15	9.87
AV	1.897M	22.07	46.00	-23.93	19.67	Line	-	2.40	9.65	0.15	9.87
QP	2.824M	30.97	56.00	-25.03	19.69	Line	-	11.28	9.65	0.17	9.87
AV	2.824M	19.28	46.00	-26.72	19.69	Line	-	-0.41	9.65	0.17	9.87

Remark :

Level (dBuV/m) = Raw(Read Level) +LISN(LISN Factor) + CL(Cable Loss) +AT(Attenuator)

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)	712.5k	1.052M	1M05F1D	711.25k	1.049M

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

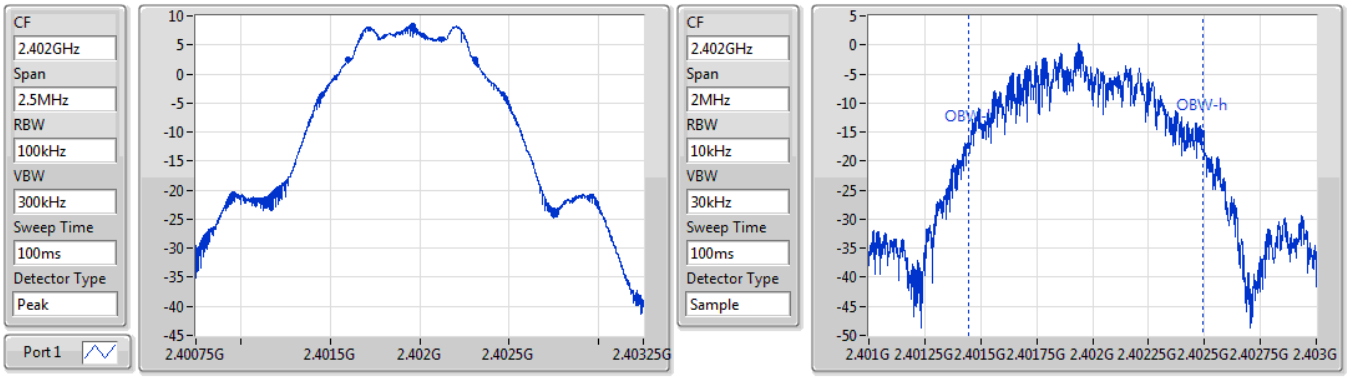
Mode	Result	Limit (Hz)	Port 1-N dB (Hz)	Port 1-OBW (Hz)
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	500k	711.25k	1.05M
2440MHz	Pass	500k	712.5k	1.052M
2480MHz	Pass	500k	711.25k	1.049M

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

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

2402MHz

20/05/2020

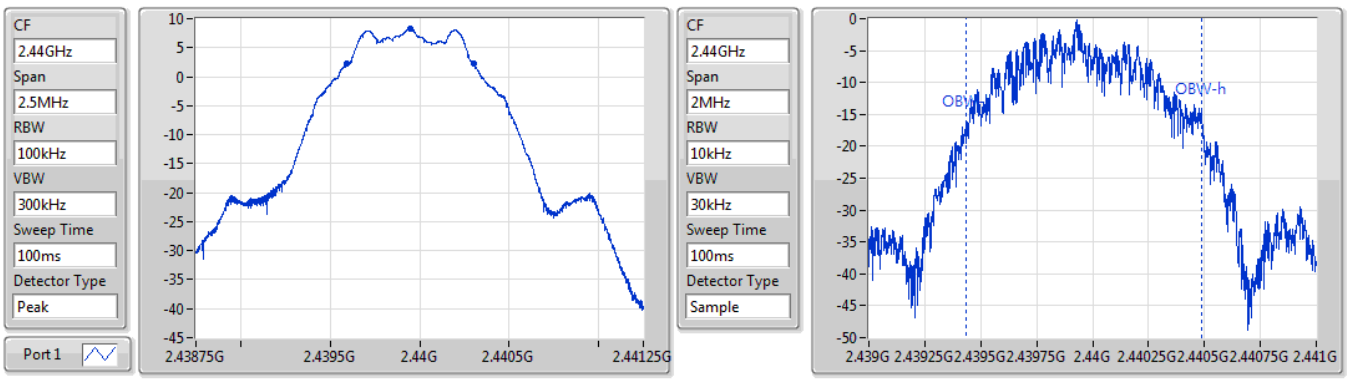


6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
711.25k	2.401601G	2.402313G	1.05M	2.401444G	2.402495G	500k	1

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

2440MHz

20/05/2020

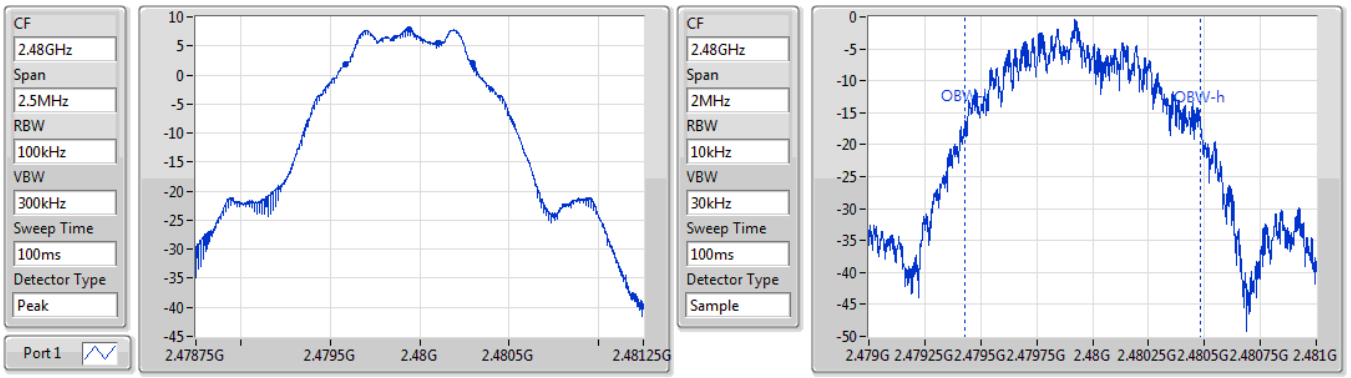


6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
712.5k	2.439591G	2.440304G	1.052M	2.439435G	2.440488G	500k	1

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

2480MHz

20/05/2020



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
711.25k	2.479585G	2.480296G	1.049M	2.47943G	2.48048G	500k	1

Summary

Mode	Power (dBm)	Power (W)
2.4-2.4835GHz	-	-
BT-LE(1Mbps)	8.57	0.00719

Result

Mode	Result	Gain (dBi)	Power (dBm)	Power Limit (dBm)
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	1.37	8.57	30.00
2440MHz	Pass	1.08	8.30	30.00
2480MHz	Pass	1.08	8.10	30.00

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

Summary

Mode	PD (dBm/RBW)
2.4-2.4835GHz	-
BT-LE(1Mbps)	-5.14

RBW=3 kHz.

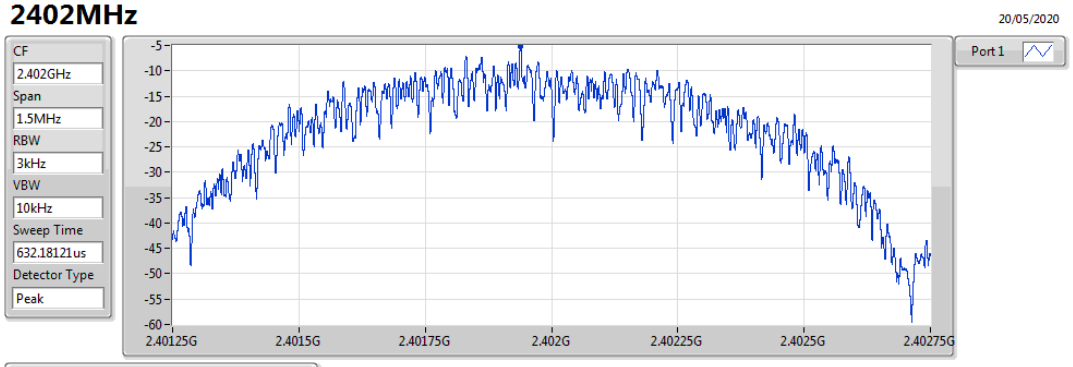
Result

Mode	Result	Gain (dBi)	PD (dBm/RBW)	PD Limit (dBm/RBW)
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	1.37	-5.14	8.00
2440MHz	Pass	1.08	-6.57	8.00
2480MHz	Pass	1.08	-6.90	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**

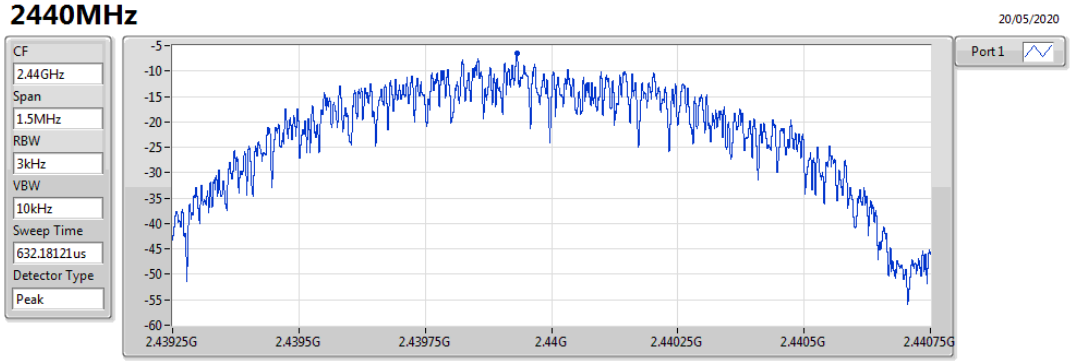
2402MHz



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-5.14	-5.14	-5.14

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

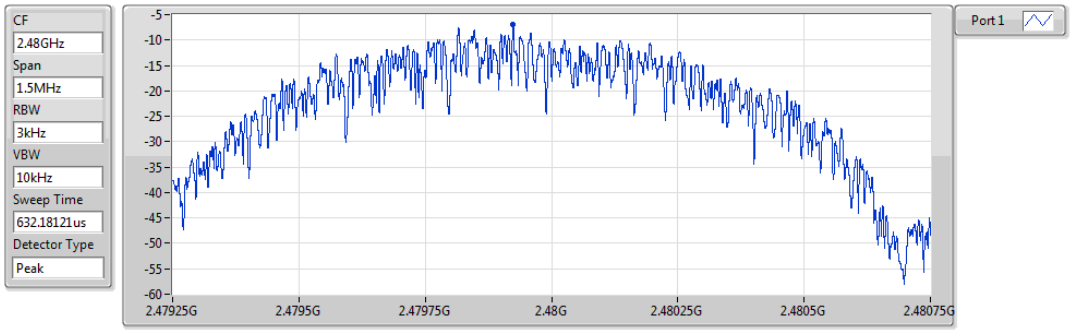
2440MHz



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-6.57	-6.57	-6.57

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

2480MHz



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-6.90	-6.90	-6.90

Summary

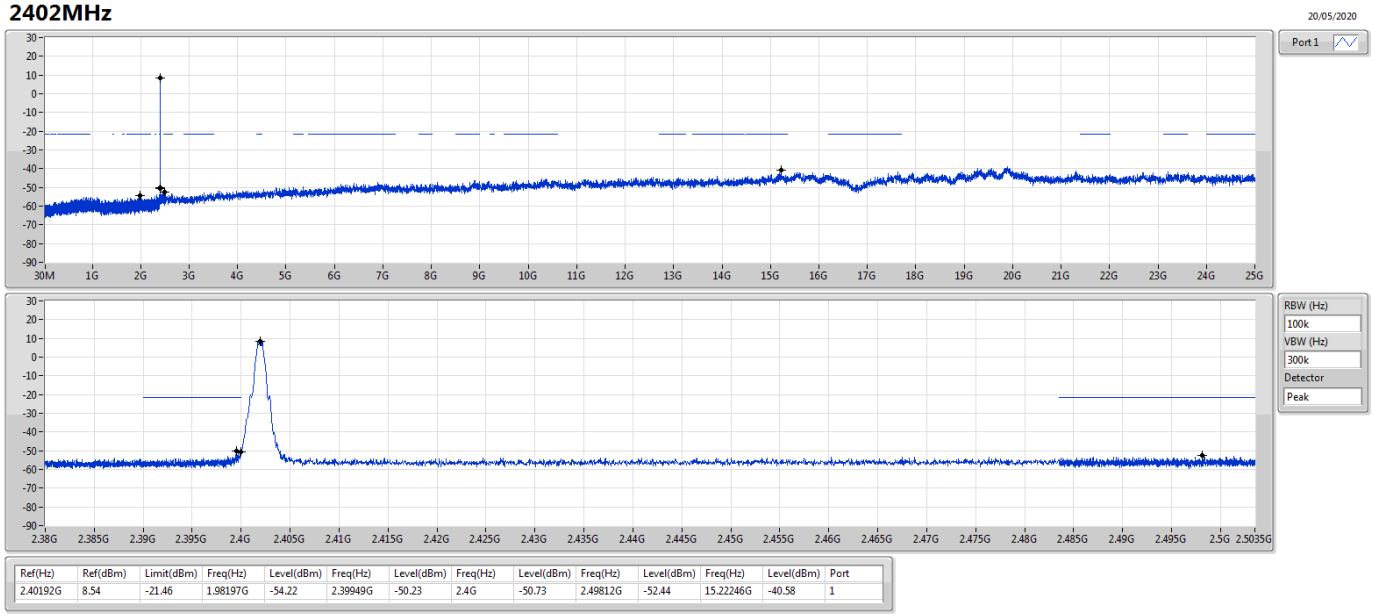
Mode	Result	Ref (Hz)	Ref (dBm)	Limit (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Port
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BT-LE(1Mbps)	Pass	2.40192G	8.54	-21.46	1.98197G	-54.22	2.39949G	-50.23	2.4G	-50.73	2.49812G	-52.44	15.22246G	-40.58	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	Pass	2.40192G	8.54	-21.46	1.98197G	-54.22	2.39949G	-50.23	2.4G	-50.73	2.49812G	-52.44	15.22246G	-40.58	1
2440MHz	Pass	2.40192G	8.54	-21.46	2.14294G	-54.06	2.39471G	-54.33	2.4835G	-56.59	2.49891G	-51.71	17.46367G	-41.74	1
2480MHz	Pass	2.40192G	8.54	-21.46	2.30509G	-55.23	2.39335G	-53.92	2.4835G	-54.28	2.48939G	-52.13	23.30433G	-41.51	1

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

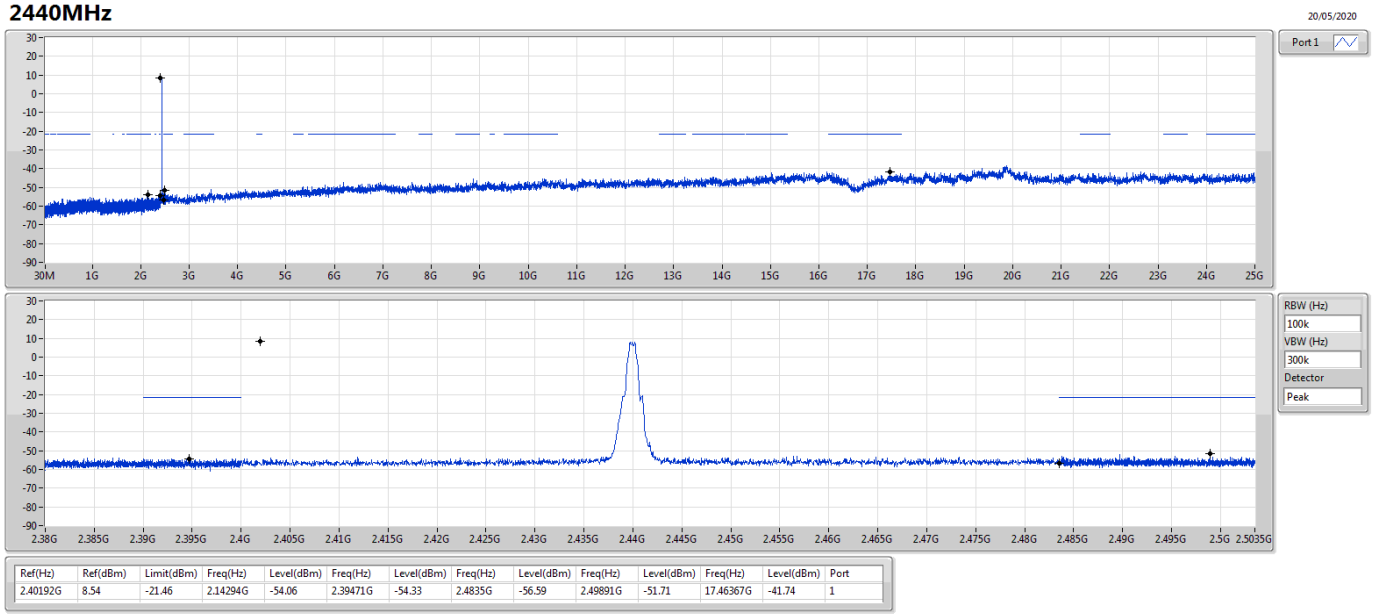
2402MHz



Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.40192G	8.54	-21.46	1.98197G	-54.22	2.39949G	-50.23	2.4G	-50.73	2.49812G	-52.44	15.22246G	-40.58	1

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

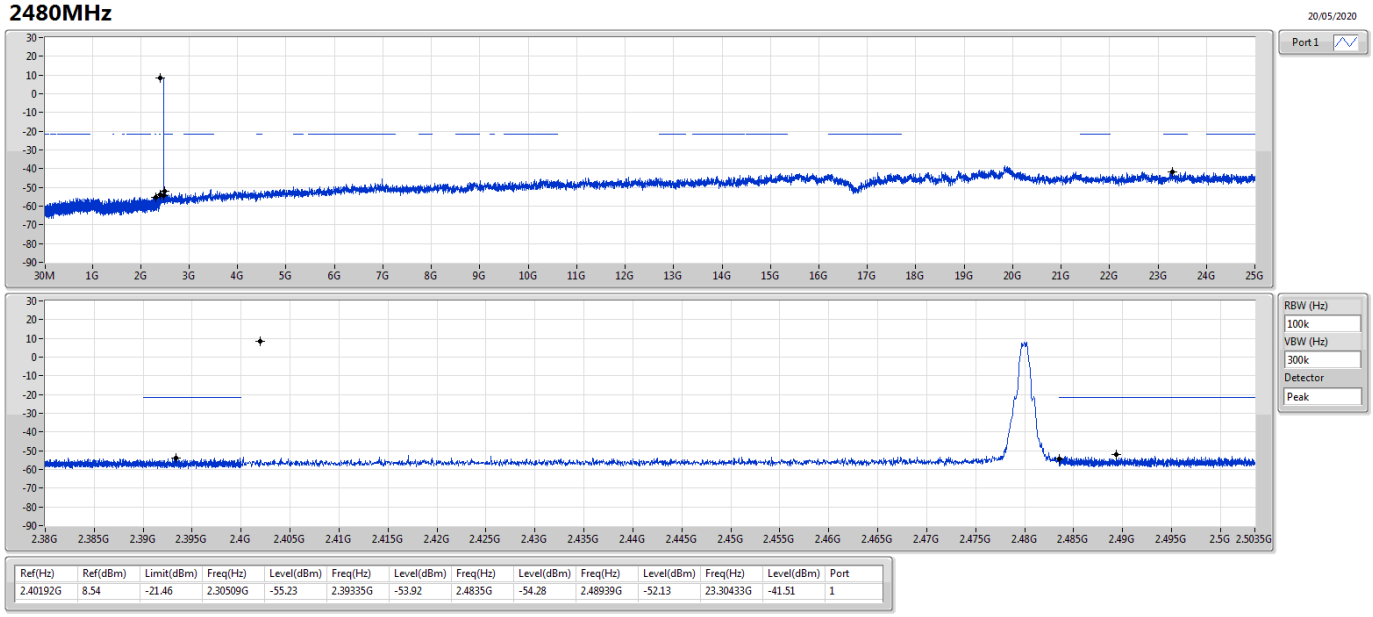
2440MHz



Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.40192G	8.54	-21.46	2.14294G	-54.06	2.39471G	-54.33	2.4835G	-56.59	2.49891G	-51.71	17.46367G	-41.74	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)	Freq(Hz)	Level(dBm)	Port
2.40192G	8.54	-21.46	2.30509G	-55.23	2.39335G	-53.92	2.4835G	-54.28	2.48939G	-52.13	23.30433G	-41.51	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	260.86M	36.43	46.00	-9.57	3	Horizontal	0	1.00	-

Remark :

Level (dBuV/m) = Raw(Read Level) + AF(Antenna Factor) + CL(Cable Loss) - PA(Preamp Factor) 042505

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	Pass	PK	237.58M	31.94	46.00	-14.06	3	Vertical	360	1.00	-
2440MHz	Pass	PK	255.04M	33.43	46.00	-12.57	3	Vertical	360	1.00	-
2440MHz	Pass	PK	357.86M	28.68	46.00	-17.32	3	Vertical	360	1.00	-
2440MHz	Pass	PK	400.54M	27.08	46.00	-18.92	3	Vertical	360	1.00	-
2440MHz	Pass	PK	433.52M	29.68	46.00	-16.32	3	Vertical	360	1.00	-
2440MHz	Pass	PK	549.92M	27.82	46.00	-18.18	3	Vertical	360	1.00	-
2440MHz	Pass	PK	57.16M	27.25	40.00	-12.75	3	Horizontal	0	1.00	-
2440MHz	Pass	PK	97.9M	27.96	43.50	-15.54	3	Horizontal	0	1.00	-
2440MHz	Pass	PK	260.86M	36.43	46.00	-9.57	3	Horizontal	0	1.00	-
2440MHz	Pass	PK	313.24M	36.11	46.00	-9.89	3	Horizontal	0	1.00	-
2440MHz	Pass	PK	522.76M	29.17	46.00	-16.83	3	Horizontal	0	1.00	-
2440MHz	Pass	PK	650.8M	30.68	46.00	-15.32	3	Horizontal	0	1.00	-

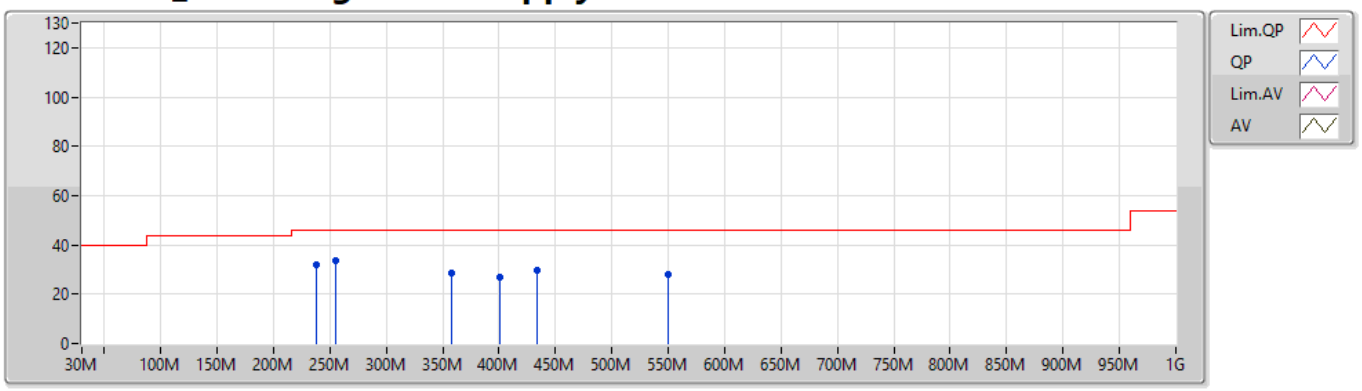
Remark :

Level (dBuV/m) = Raw(Read Level) + AF(Antenna Factor) + CL(Cable Loss) - PA(Preamp Factor) 042505

BT-LE(1Mbps)

20/05/2020

2440MHz_Switching 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	237.58M	31.94	46.00	-14.06	-19.06	3	Vertical	360	1.00	-	51.00	16.06	1.25	36.37
PK	255.04M	33.43	46.00	-12.57	-16.78	3	Vertical	360	1.00	-	50.21	18.33	1.31	36.42
PK	357.86M	28.68	46.00	-17.32	-15.28	3	Vertical	360	1.00	-	43.96	19.68	1.53	36.49
PK	400.54M	27.08	46.00	-18.92	-13.79	3	Vertical	360	1.00	-	40.87	20.93	1.70	36.42
PK	433.52M	29.68	46.00	-16.32	-12.92	3	Vertical	360	1.00	-	42.60	21.86	1.77	36.55
PK	549.92M	27.82	46.00	-18.18	-11.02	3	Vertical	360	1.00	-	38.84	24.07	2.00	37.09

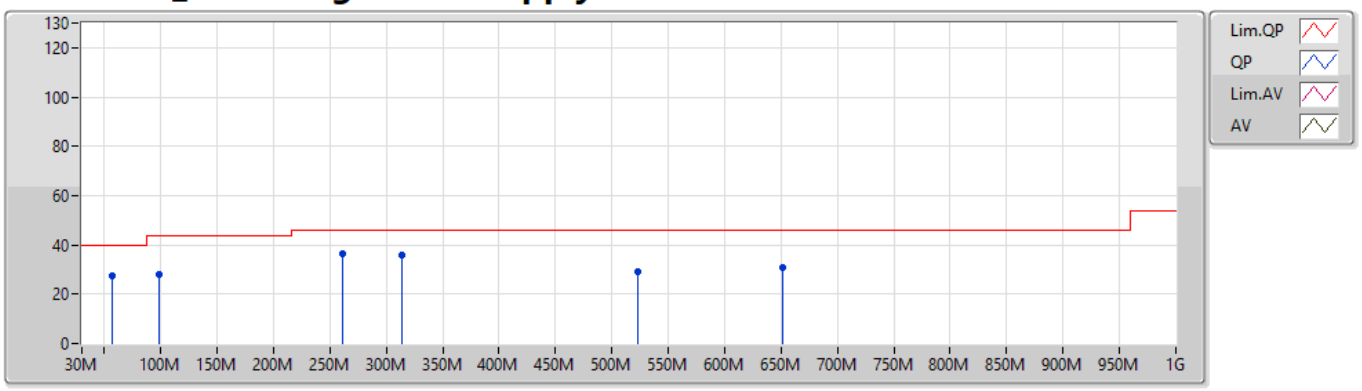
Remark :

Level (dBuV/m) = Raw(Read Level) + AF(Antenna Factor) + CL(Cable Loss) - PA(Preamp Factor) 042505

BT-LE(1Mbps)

20/05/2020

2440MHz_Switching 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	57.16M	27.25	40.00	-12.75	-25.21	3	Horizontal	0	1.00	-	52.46	11.18	0.60	36.99
PK	97.9M	27.96	43.50	-15.54	-20.90	3	Horizontal	0	1.00	-	48.86	14.90	0.76	36.56
PK	260.86M	36.43	46.00	-9.57	-15.83	3	Horizontal	0	1.00	-	52.26	19.26	1.32	36.41
PK	313.24M	36.11	46.00	-9.89	-16.57	3	Horizontal	0	1.00	-	52.68	18.39	1.43	36.39
PK	522.76M	29.17	46.00	-16.83	-12.08	3	Horizontal	0	1.00	-	41.25	23.01	1.95	37.04
PK	650.8M	30.68	46.00	-15.32	-9.35	3	Horizontal	0	1.00	-	40.03	25.44	2.20	36.99

Remark :

Level (dBuV/m) = Raw(Read Level) + AF(Antenna Factor) + CL(Cable Loss) - PA(Preamp Factor) 042505

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	2.4835G	48.33	54.00	-5.67	3	Horizontal	347	2.25	-

Remark :

Level (dBuV/m) = Raw(Read Level) + AF(Antenna Factor) + CL(Cable Loss) - PA(Preamp Factor) 042505

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	2.3608G	46.84	54.00	-7.16	3	Vertical	37	2.08	-
2402MHz	Pass	AV	2.402G	99.74	Inf	-Inf	3	Vertical	37	2.08	-
2402MHz	Pass	PK	2.3802G	58.44	74.00	-15.56	3	Vertical	37	2.08	-
2402MHz	Pass	PK	2.4018G	101.29	Inf	-Inf	3	Vertical	37	2.08	-
2402MHz	Pass	AV	2.3666G	46.87	54.00	-7.13	3	Horizontal	329	2.03	-
2402MHz	Pass	AV	2.402G	102.77	Inf	-Inf	3	Horizontal	329	2.03	-
2402MHz	Pass	PK	2.3726G	58.43	74.00	-15.57	3	Horizontal	329	2.03	-
2402MHz	Pass	PK	2.4018G	104.28	Inf	-Inf	3	Horizontal	329	2.03	-
2402MHz	Pass	AV	4.80332G	32.33	54.00	-21.67	3	Vertical	0	1.49	-
2402MHz	Pass	PK	4.80417G	44.26	74.00	-29.74	3	Vertical	0	1.49	-
2402MHz	Pass	AV	4.80365G	33.99	54.00	-20.01	3	Horizontal	0	1.49	-
2402MHz	Pass	PK	4.80396G	45.72	74.00	-28.28	3	Horizontal	0	1.49	-
2440MHz	Pass	AV	2.3528G	46.94	54.00	-7.06	3	Vertical	39	1.62	-
2440MHz	Pass	AV	2.44G	100.71	Inf	-Inf	3	Vertical	39	1.62	-
2440MHz	Pass	AV	2.498G	46.73	54.00	-7.27	3	Vertical	39	1.62	-
2440MHz	Pass	PK	2.344G	58.30	74.00	-15.70	3	Vertical	39	1.62	-
2440MHz	Pass	PK	2.4396G	102.25	Inf	-Inf	3	Vertical	39	1.62	-
2440MHz	Pass	PK	2.4972G	57.42	74.00	-16.58	3	Vertical	39	1.62	-
2440MHz	Pass	AV	2.3572G	46.63	54.00	-7.37	3	Horizontal	327	2.74	-
2440MHz	Pass	AV	2.44G	102.82	Inf	-Inf	3	Horizontal	327	2.74	-
2440MHz	Pass	AV	2.4964G	46.66	54.00	-7.34	3	Horizontal	327	2.74	-
2440MHz	Pass	PK	2.3624G	58.31	74.00	-15.69	3	Horizontal	327	2.74	-
2440MHz	Pass	PK	2.4396G	104.34	Inf	-Inf	3	Horizontal	327	2.74	-
2440MHz	Pass	PK	2.496G	57.90	74.00	-16.10	3	Horizontal	327	2.74	-
2440MHz	Pass	AV	4.87764G	32.25	54.00	-21.75	3	Vertical	193	1.49	-
2440MHz	Pass	PK	4.88127G	44.04	74.00	-29.96	3	Vertical	193	1.49	-
2440MHz	Pass	AV	4.87949G	33.46	54.00	-20.54	3	Horizontal	0	1.49	-
2440MHz	Pass	PK	4.87958G	44.90	74.00	-29.10	3	Horizontal	0	1.49	-
2480MHz	Pass	AV	2.48G	100.01	Inf	-Inf	3	Vertical	43	1.47	-
2480MHz	Pass	AV	2.4835G	48.28	54.00	-5.72	3	Vertical	43	1.47	-
2480MHz	Pass	PK	2.4796G	101.51	Inf	-Inf	3	Vertical	43	1.47	-
2480MHz	Pass	PK	2.4894G	57.76	74.00	-16.24	3	Vertical	43	1.47	-
2480MHz	Pass	AV	2.48G	100.08	Inf	-Inf	3	Horizontal	347	2.25	-
2480MHz	Pass	AV	2.4835G	48.33	54.00	-5.67	3	Horizontal	347	2.25	-
2480MHz	Pass	PK	2.4796G	101.56	Inf	-Inf	3	Horizontal	347	2.25	-
2480MHz	Pass	PK	2.4835G	57.88	74.00	-16.12	3	Horizontal	347	2.25	-
2480MHz	Pass	AV	4.9595G	33.62	54.00	-20.38	3	Vertical	262	1.49	-
2480MHz	Pass	PK	4.95992G	45.32	74.00	-28.68	3	Vertical	262	1.49	-
2480MHz	Pass	AV	4.95964G	33.90	54.00	-20.10	3	Horizontal	7	1.49	-
2480MHz	Pass	PK	4.95964G	45.26	74.00	-28.74	3	Horizontal	7	1.49	-

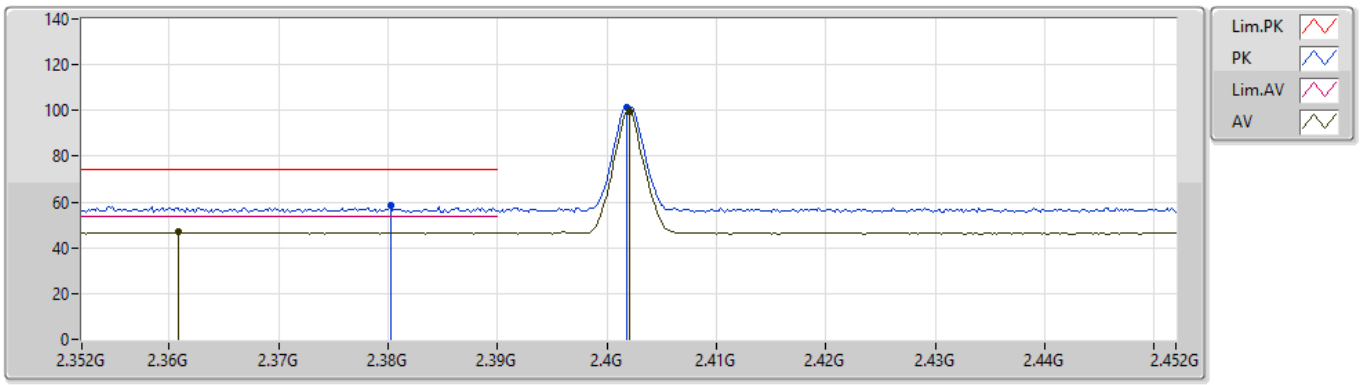
Remark :

Level (dBuV/m) = Raw(Read Level) + AF(Antenna Factor) + CL(Cable Loss) - PA(Preamp Factor) 042505

BT-LE(1Mbps)

17/05/2020

2402MHz_TX

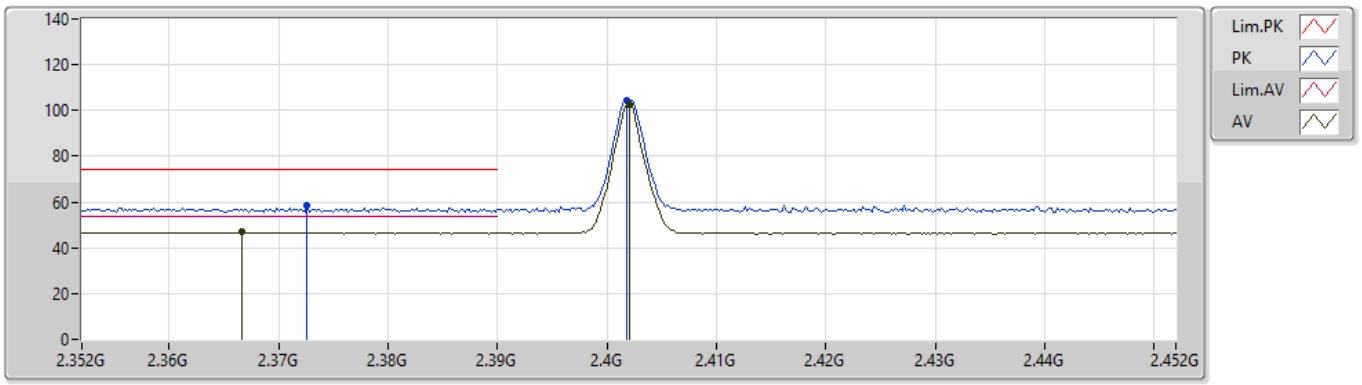


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
AV	2.3608G	46.84	54.00	-7.16	33.65	3	Vertical	37	2.08	-	13.19	27.72	5.93	-
AV	2.402G	99.74	Inf	-Inf	33.76	3	Vertical	37	2.08	-	65.98	27.80	5.96	-
PK	2.3802G	58.44	74.00	-15.56	33.71	3	Vertical	37	2.08	-	24.73	27.76	5.95	-
PK	2.4018G	101.29	Inf	-Inf	33.76	3	Vertical	37	2.08	-	67.53	27.80	5.96	-

BT-LE(1Mbps)

17/05/2020

2402MHz_TX

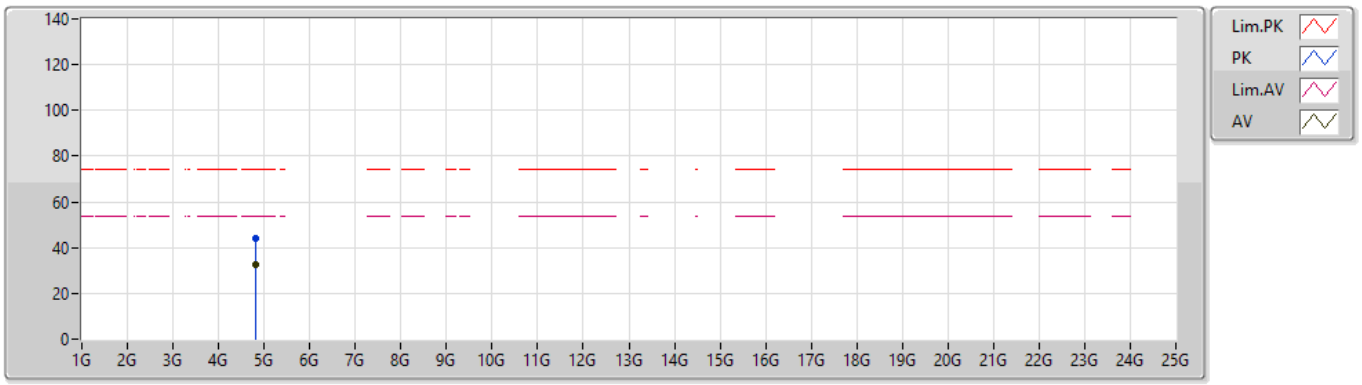


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
AV	2.3666G	46.87	54.00	-7.13	33.66	3	Horizontal	329	2.03	-	13.21	27.73	5.93	-
AV	2.402G	102.77	Inf	-Inf	33.76	3	Horizontal	329	2.03	-	69.01	27.80	5.96	-
PK	2.3726G	58.43	74.00	-15.57	33.69	3	Horizontal	329	2.03	-	24.74	27.75	5.94	-
PK	2.4018G	104.28	Inf	-Inf	33.76	3	Horizontal	329	2.03	-	70.52	27.80	5.96	-

BT-LE(1Mbps)

17/05/2020

2402MHz_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	4.80332G	32.33	54.00	-21.67	5.65	3	Vertical	0	1.49	-	26.68	31.31	8.25	33.91
PK	4.80417G	44.26	74.00	-29.74	5.65	3	Vertical	0	1.49	-	38.61	31.31	8.25	33.91

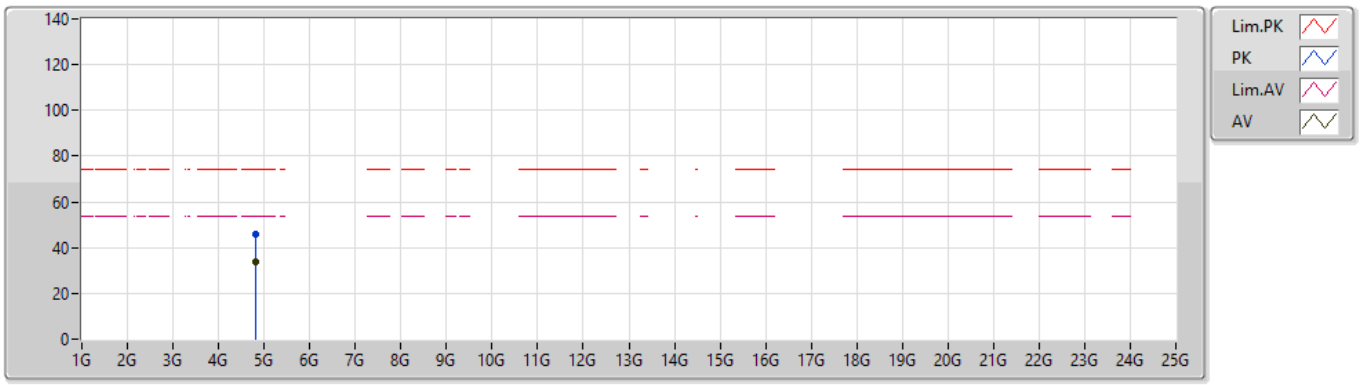
Remark :

Level (dBuV/m) = Raw(Read Level) + AF(Antenna Factor) + CL(Cable Loss) - PA(Preamp Factor) 042505

BT-LE(1Mbps)

2402MHz_TX

17/05/2020



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	4.80365G	33.99	54.00	-20.01	5.65	3	Horizontal	0	1.49	-	28.34	31.31	8.25	33.91
PK	4.80396G	45.72	74.00	-28.28	5.65	3	Horizontal	0	1.49	-	40.07	31.31	8.25	33.91

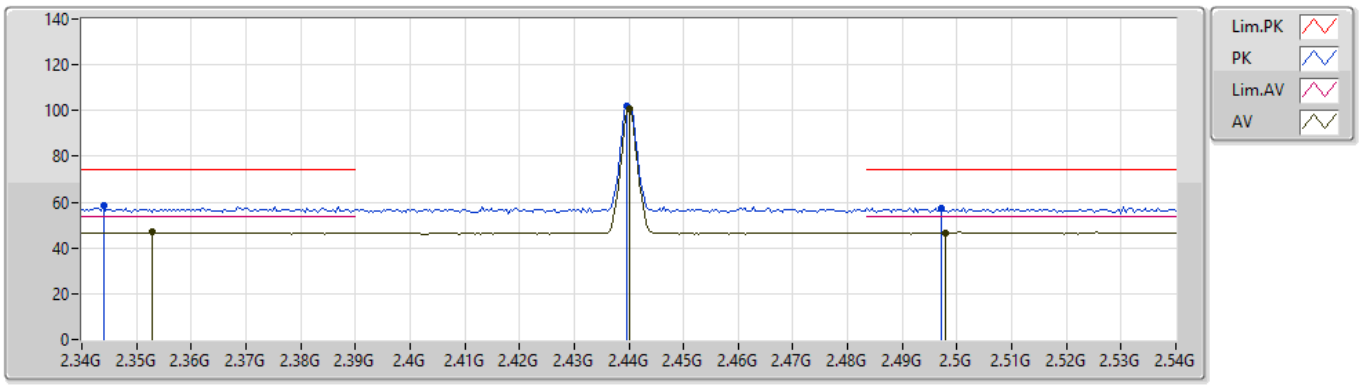
Remark :

Level (dBuV/m) = Raw(Read Level) + AF(Antenna Factor) + CL(Cable Loss) - PA(Preamp Factor) 042505

BT-LE(1Mbps)

2440MHz_TX

17/05/2020

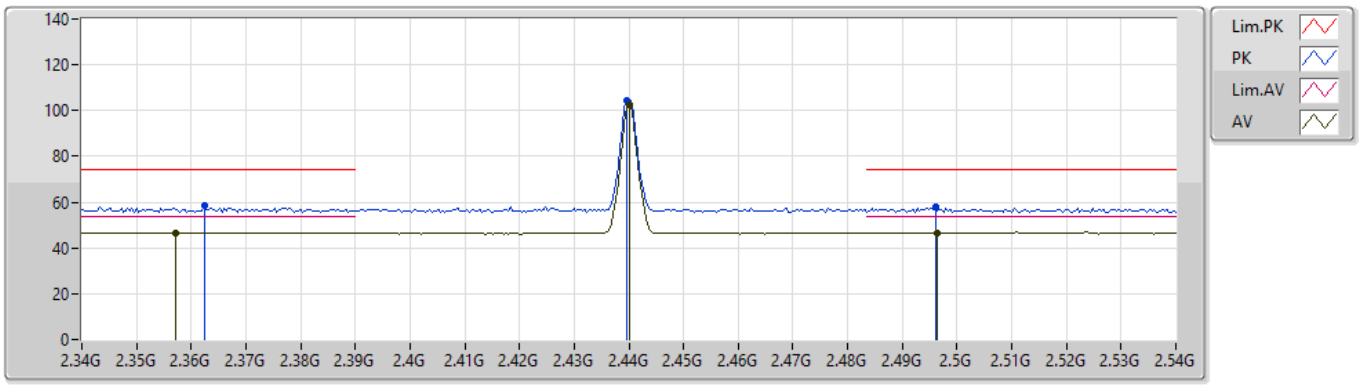


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
AV	2.3528G	46.94	54.00	-7.06	33.63	3	Vertical	39	1.62	-	13.31	27.71	5.92	-
AV	2.44G	100.71	Inf	-Inf	33.73	3	Vertical	39	1.62	-	66.98	27.72	6.01	-
AV	2.498G	46.73	54.00	-7.27	33.78	3	Vertical	39	1.62	-	12.95	27.70	6.08	-
PK	2.344G	58.30	74.00	-15.70	33.63	3	Vertical	39	1.62	-	24.67	27.71	5.92	-
PK	2.4396G	102.25	Inf	-Inf	33.73	3	Vertical	39	1.62	-	68.52	27.72	6.01	-
PK	2.4972G	57.42	74.00	-16.58	33.78	3	Vertical	39	1.62	-	23.64	27.70	6.08	-

BT-LE(1Mbps)

2440MHz_TX

17/05/2020

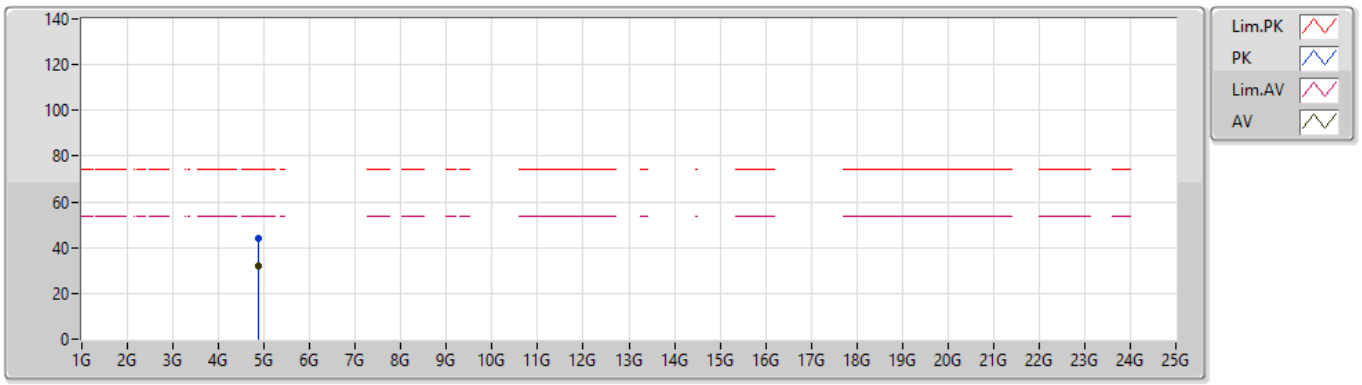


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
AV	2.3572G	46.63	54.00	-7.37	33.64	3	Horizontal	327	2.74	-	12.99	27.71	5.93	-
AV	2.44G	102.82	Inf	-Inf	33.73	3	Horizontal	327	2.74	-	69.09	27.72	6.01	-
AV	2.4964G	46.66	54.00	-7.34	33.78	3	Horizontal	327	2.74	-	12.88	27.70	6.08	-
PK	2.3624G	58.31	74.00	-15.69	33.65	3	Horizontal	327	2.74	-	24.66	27.72	5.93	-
PK	2.4396G	104.34	Inf	-Inf	33.73	3	Horizontal	327	2.74	-	70.61	27.72	6.01	-
PK	2.496G	57.90	74.00	-16.10	33.78	3	Horizontal	327	2.74	-	24.12	27.70	6.08	-

BT-LE(1Mbps)

2440MHz_TX

17/05/2020



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	4.87764G	32.25	54.00	-21.75	5.77	3	Vertical	193	1.49	-	26.48	31.34	8.30	33.87
PK	4.88127G	44.04	74.00	-29.96	5.77	3	Vertical	193	1.49	-	38.27	31.34	8.30	33.87

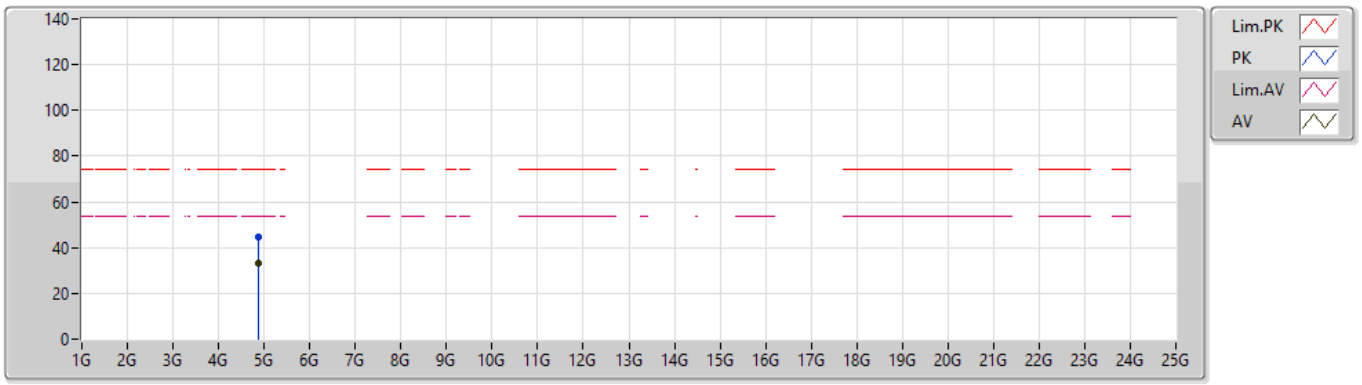
Remark :

Level (dBuV/m) = Raw(Read Level) + AF(Antenna Factor) + CL(Cable Loss) - PA(Preamp Factor)

BT-LE(1Mbps)

2440MHz_TX

17/05/2020



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	4.87949G	33.46	54.00	-20.54	5.77	3	Horizontal	0	1.49	-	27.69	31.34	8.30	33.87
PK	4.87958G	44.90	74.00	-29.10	5.77	3	Horizontal	0	1.49	-	39.13	31.34	8.30	33.87

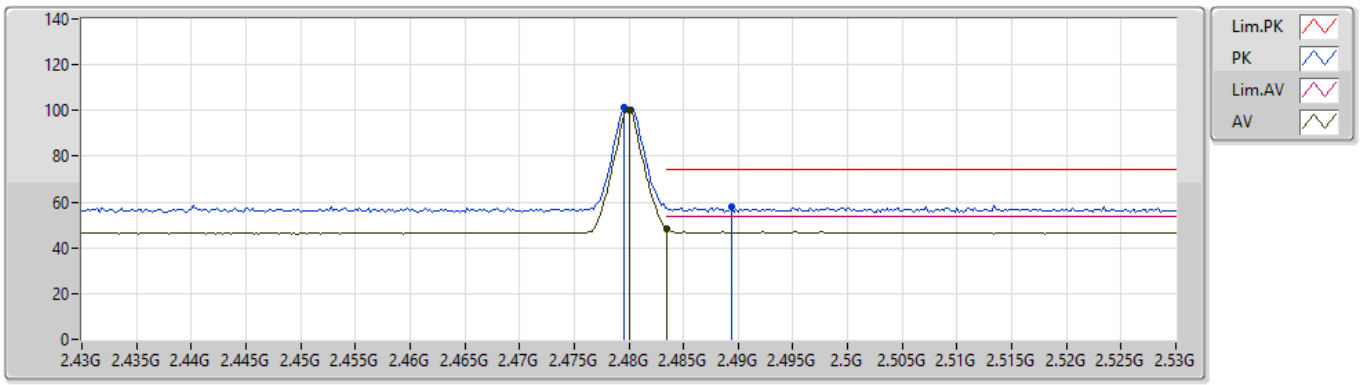
Remark :

Level (dBuV/m) = Raw(Read Level) + AF(Antenna Factor) + CL(Cable Loss) - PA(Preamp Factor) 042505

BT-LE(1Mbps)

2480MHz_TX

17/05/2020



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	100.01	Inf	-Inf	33.76	3	Vertical	43	1.47	-	66.25	27.70	6.06	-
AV	2.4835G	48.28	54.00	-5.72	33.76	3	Vertical	43	1.47	-	14.52	27.70	6.06	-
PK	2.4796G	101.51	Inf	-Inf	33.76	3	Vertical	43	1.47	-	67.75	27.70	6.06	-
PK	2.4894G	57.76	74.00	-16.24	33.77	3	Vertical	43	1.47	-	23.99	27.70	6.07	-

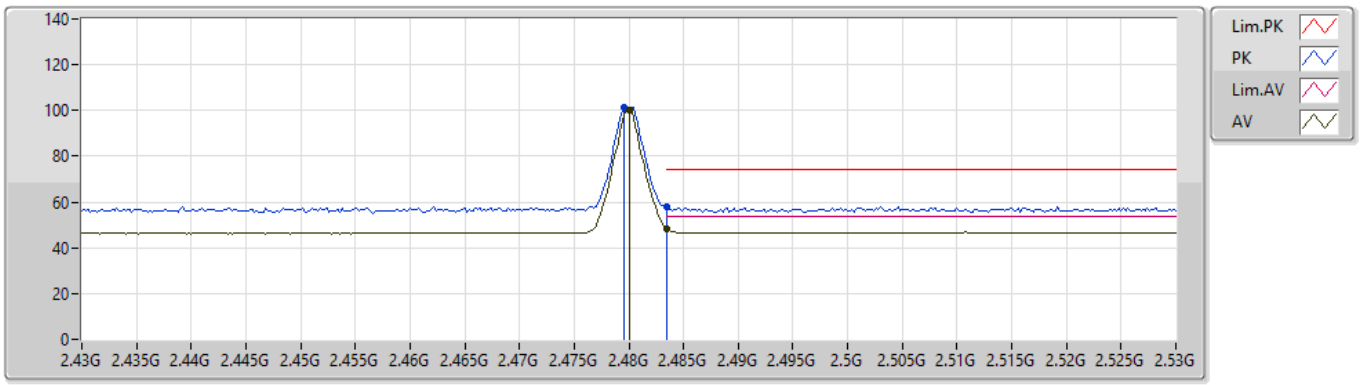
Remark :

Level (dBuV/m) = Raw(Read Level) + AF(Antenna Factor) + CL(Cable Loss) - PA(Preamp Factor) 042505

BT-LE(1Mbps)

2480MHz_TX

17/05/2020



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	100.08	Inf	-Inf	33.76	3	Horizontal	347	2.25	-	66.32	27.70	6.06	-
AV	2.4835G	48.33	54.00	-5.67	33.76	3	Horizontal	347	2.25	-	14.57	27.70	6.06	-
PK	2.4796G	101.56	Inf	-Inf	33.76	3	Horizontal	347	2.25	-	67.80	27.70	6.06	-
PK	2.4835G	57.88	74.00	-16.12	33.76	3	Horizontal	347	2.25	-	24.12	27.70	6.06	-

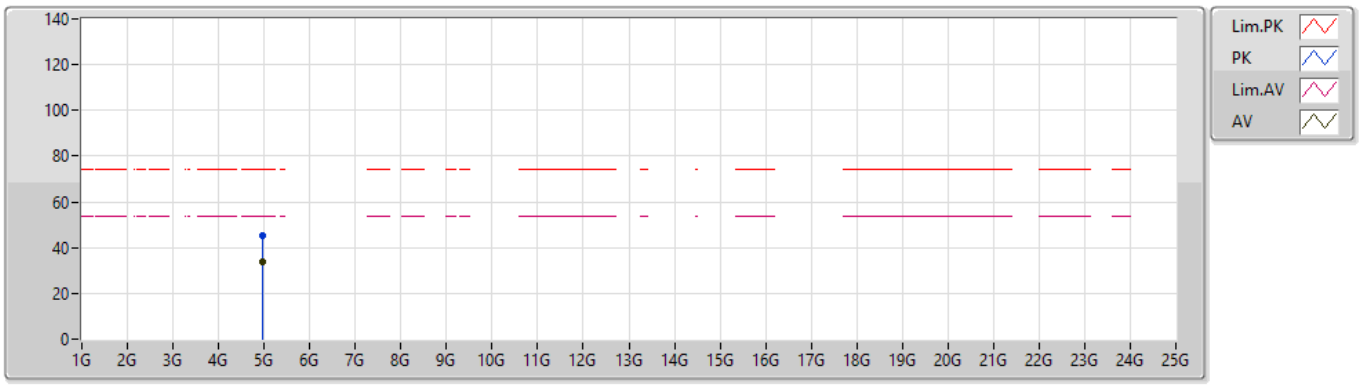
Remark :

Level (dBuV/m) = Raw(Read Level) + AF(Antenna Factor) + CL(Cable Loss) - PA(Preamp Factor)

BT-LE(1Mbps)

2480MHz_TX

17/05/2020



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	4.9595G	33.62	54.00	-20.38	5.99	3	Vertical	262	1.49	-	27.63	31.46	8.35	33.82
PK	4.95992G	45.32	74.00	-28.68	5.99	3	Vertical	262	1.49	-	39.33	31.46	8.35	33.82

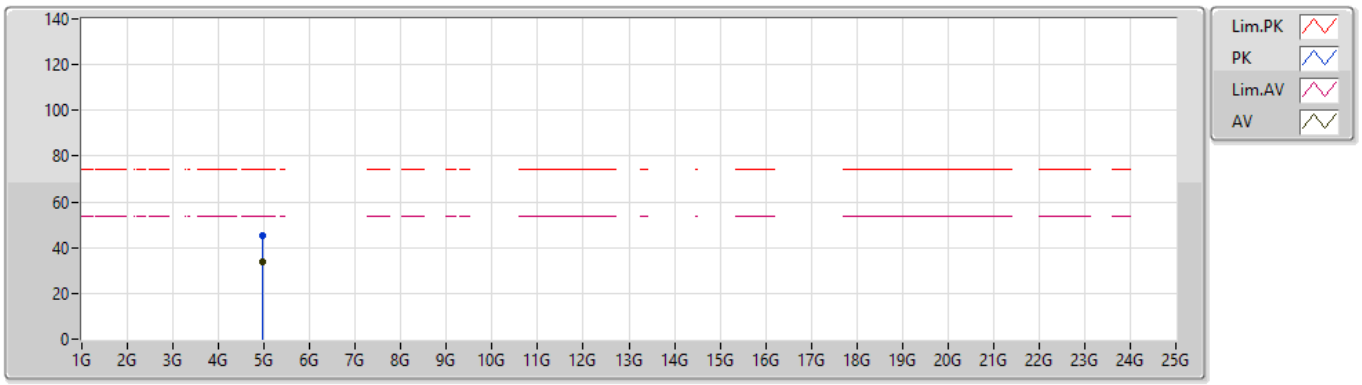
Remark :

Level (dBuV/m) = Raw(Read Level) + AF(Antenna Factor) + CL(Cable Loss) - PA(Preamp Factor) 042505

BT-LE(1Mbps)

2480MHz_TX

17/05/2020



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	4.95964G	33.90	54.00	-20.10	5.99	3	Horizontal	7	1.49	-	27.91	31.46	8.35	33.82
PK	4.95964G	45.26	74.00	-28.74	5.99	3	Horizontal	7	1.49	-	39.27	31.46	8.35	33.82

Remark :

Level (dBuV/m) = Raw(Read Level) + AF(Antenna Factor) + CL(Cable Loss) - PA(Preamp Factor)