

FCC Test Report

Equipment : Petcube Play
Brand Name : Petcube
Model No. : PP211NV5LC
FCC ID : 2AK4CPP211NV5LC
Standard : 47 CFR FCC Part 15.247
Operating Band : 2400 MHz – 2483.5 MHz
Function : ☒ Point-to-multipoint; ☐ Point-to-point
Applicant : Petcube, Inc.
2711 CENTERVILLE RD., STE 400, WILMINGTON, DE,
19808, USA
Manufacturer : Chicony Electronics (Dong Guan) Co.,Ltd.
San Zhong Guan Li Qu, Qingxi Town, Dongguan City
Guangdong 523651 China

The product sample received on Nov. 14, 2017 and completely tested on Nov. 22, 2017. We, SPORTON, would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.10-2013 and shown compliance with the applicable technical standards.

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

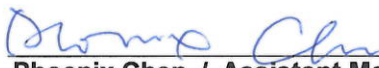

Phoenix Chen / Assistant Manager



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Summary of Test Result

Conformance Test Specifications				
Report Clause	Ref. Std. Clause	Description	Limit	Result
1.1.2	15.203	Antenna Requirement	FCC 15.203	Complied
3.1	15.207	AC Power-line Conducted Emissions	FCC 15.207	Complied
3.2	15.247(a)	DTS Bandwidth	≥500kHz	Complied
3.3	15.247(b)	Maximum Conducted Output Power	Power [dBm]:30	Complied
3.4	15.247(e)	Power Spectral Density	PSD [dBm/3kHz]:8	Complied
3.5	15.247(d)	Emissions in Non-restricted Frequency Bands	Non-Restricted Bands: >30 dBc	Complied
3.6	15.247(d)	Emissions in Restricted Frequency Bands	Restricted Bands: FCC 15.209	Complied



SPORTON INTERNATIONAL INC.
TEL : 886-3-3273456
FAX : 886-3-3270973
FCC ID: 2AK4CPP211NV5LC

1 General Description

1.1 Information

1.1.1 RF General Information

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

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

Note:

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

1.1.2 Antenna Information

Ant.	Port	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	1	-	-	PIFA Antenna	I-PEX	1.22

1.1.3 EUT Information

Operational Condition	
EUT Power Type	From AC Adapter
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)	0.626	2.034	391.25u	3k

1.1.5 Table for Multiple Listing

Sample No.	Enclosure color
1	Rose Gold
2	Black
3	Silver

Note 1: The difference of above samples is enclosure.

Note 2: EUT was pre-tested sample 1, 2 and 3 for using; the worst case was sample 3 and result of that was recorded as the final test result.

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 v04

1.3 Testing Location Information

Testing Location			
☒	HWA YA	ADD : No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)	
		TEL : 886-3-327-3456	FAX : 886-3-327-0973
Test site Designation No. TW1190 with FCC.			
☐	JHUBEI	ADD : No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County, Taiwan (R.O.C.)	
		TEL : 886-3-656-9065	FAX : 886-3-656-9085
Test site Designation No. TW0006 with FCC.			

Test Condition	Test Site No.	Test Engineer	Test Environment	Test Date
RF Conducted	TH01-HY	Andy	24.5°C / 65.3%	21/Nov/2017
Radiated	03CH09-HY	Andy	22.5°C / 58%	22/Nov/2017
AC Conduction	CO04-HY	Thor	24.3°C / 63%	21/Nov/2017

1.4 Measurement Uncertainty

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2))

Test Items	Uncertainty	Remark
Conducted Emission (150kHz ~ 30MHz)	3.6 dB	Confidence levels of 95%
Radiated Emission (30MHz ~ 1,000MHz)	2.1 dB	Confidence levels of 95%
Radiated Emission (1GHz ~ 18GHz)	2.6 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	2.9 dB	Confidence levels of 95%
Conducted Emission	1.3 dB	Confidence levels of 95%

2 Test Configuration of EUT

2.1 Test Condition

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

2.2 Test Channel Mode

Test Software	DoS
---------------	-----

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

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

2.4 Accessories

Accessories				
AC Adapter	Brand Name	Ktec	Model Name	KSA29B0500200D5
	Power Rating	I/P: 100 - 240 Vac, 0.5 A, O/P: 5 Vdc, 2.0 A		
USB Cable	Signal Line	3.05 meter, non-shielded cable, without ferrite core		

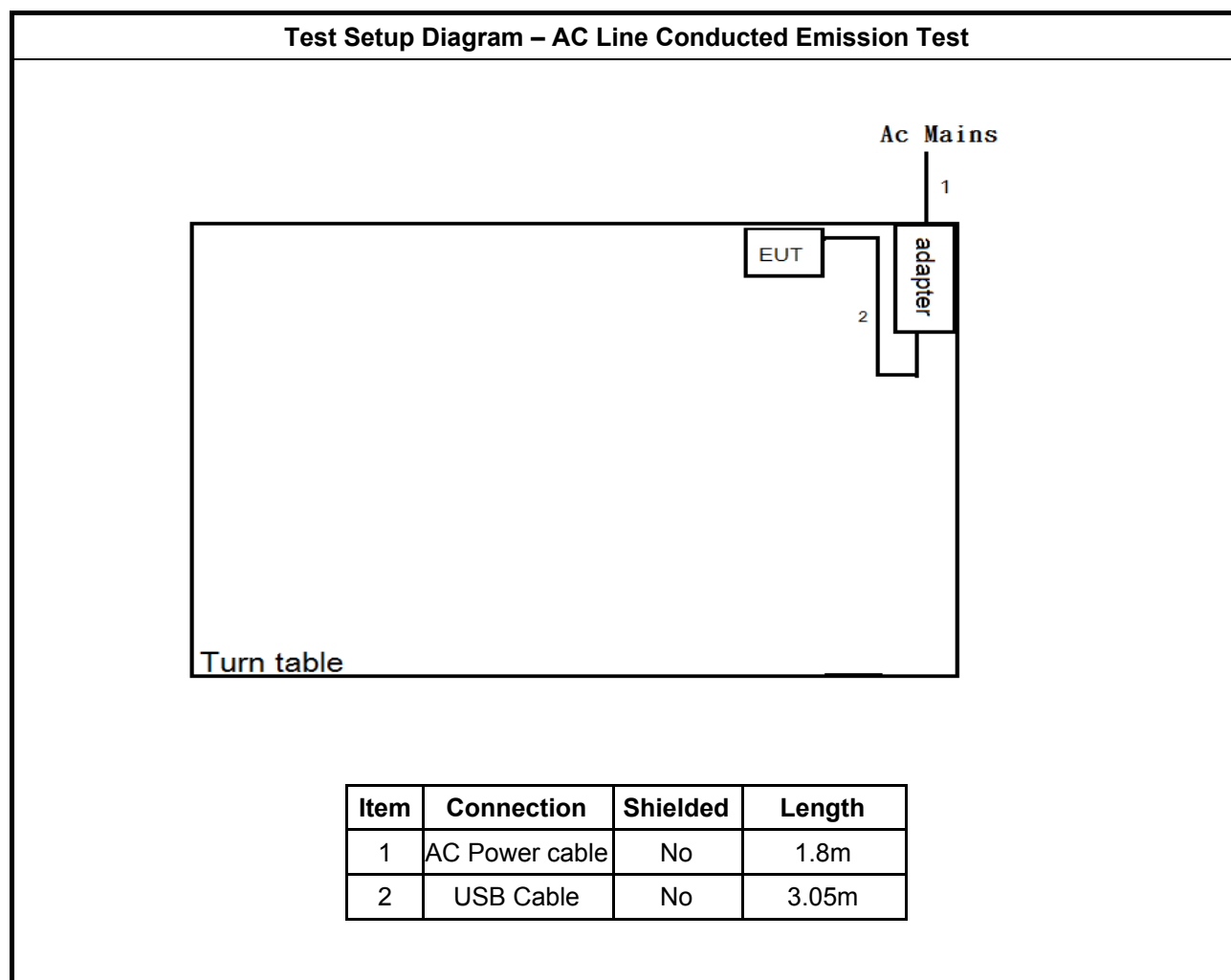
2.5 Support Equipment

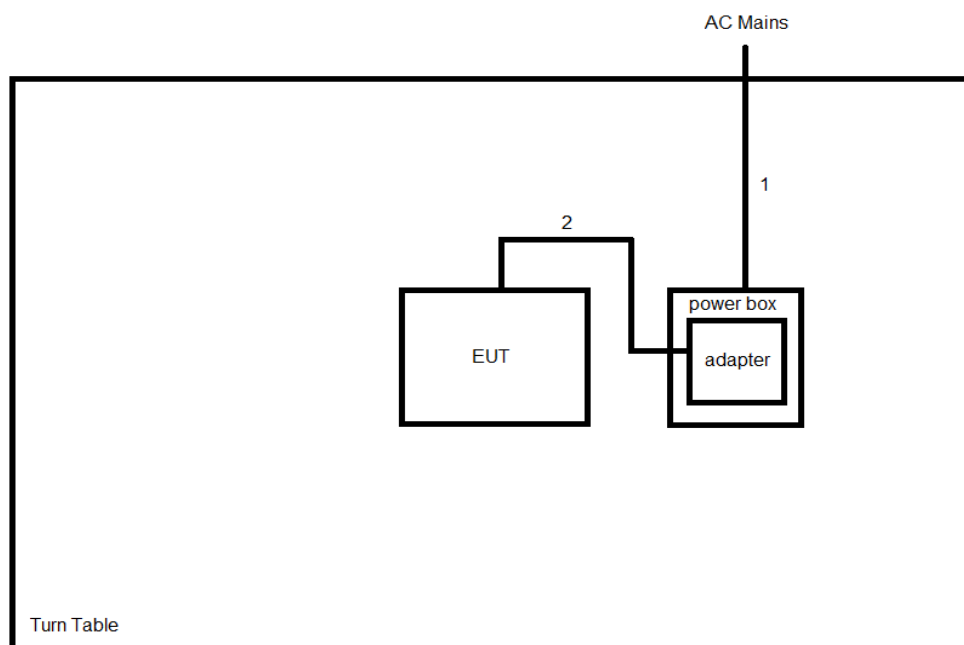
Support Equipment – RF Conducted				
No.	Equipment	Brand Name	Model Name	FCC ID
1	Notebook	DELL	E5410	DoC
2	Adapter for NB	DELL	HA65NM130	Doc

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

Support Equipment – AC Conduction				
No.	Equipment	Brand Name	Model Name	FCC ID
1	-	-	-	-

2.6 Test Setup Diagram



Test Setup Diagram – Radiated Test


Item	Connection	Shielded	Length
1	AC Power cable	No	1.7m
2	USB Cable	No	3.05m

3 Transmitter Test Result

3.1 AC Power-line Conducted Emissions

3.1.1 AC Power-line Conducted Emissions Limit

AC Power-line Conducted Emissions Limit		
Frequency Emission (MHz)	Quasi-Peak	Average
0.15-0.5	66 - 56 *	56 - 46 *
0.5-5	56	46
5-30	60	50

Note 1: * Decreases with the logarithm of the frequency.

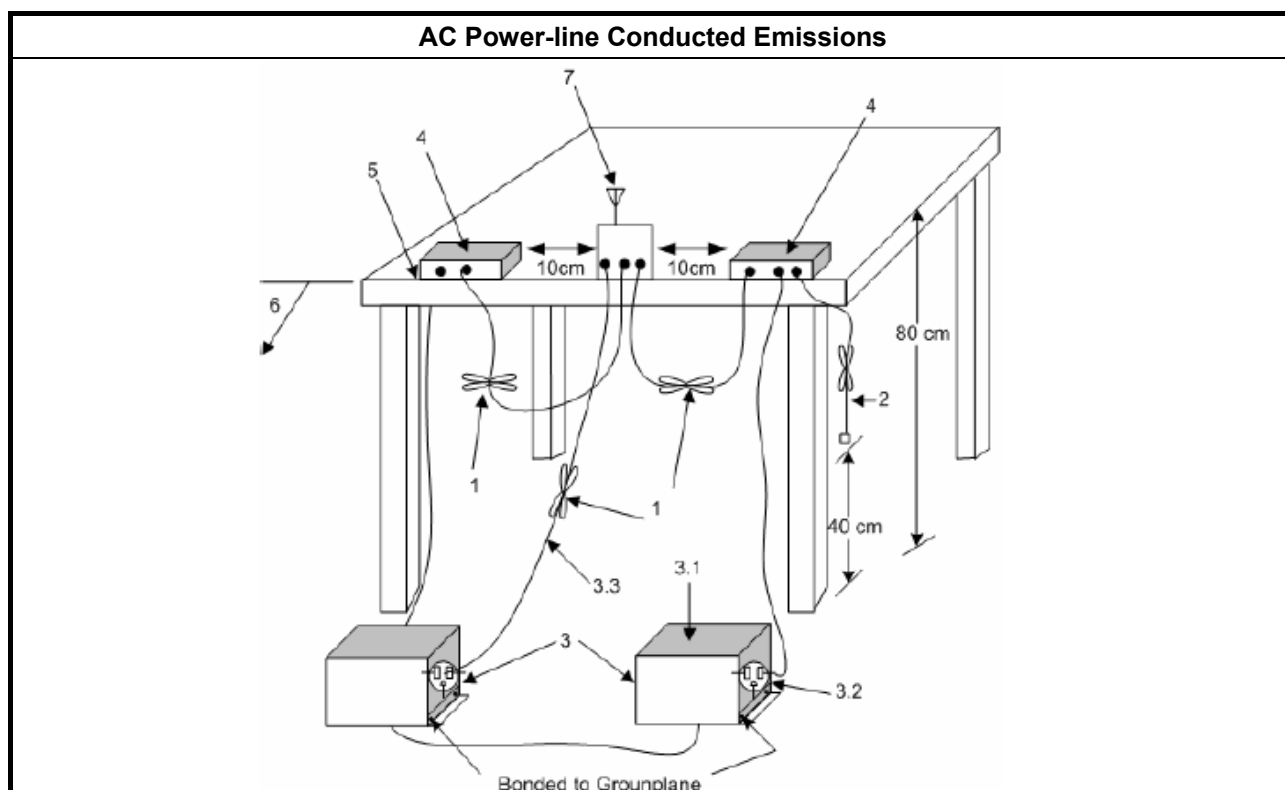
3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

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

3.1.4 Test Setup



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.

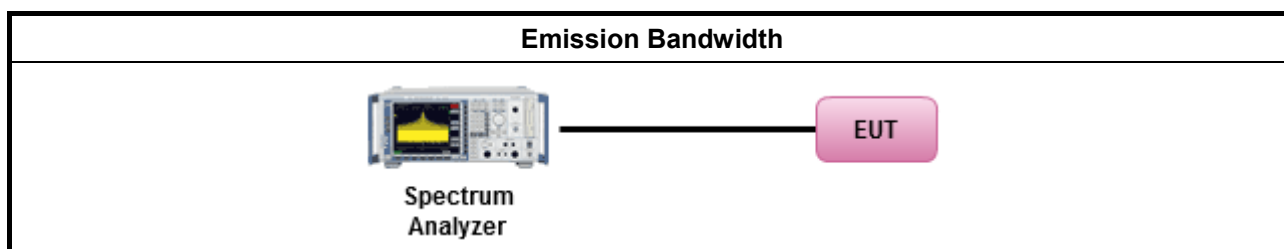
3.2.2 Measuring Instruments

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 8.1 Option 1 for 6 dB bandwidth measurement.
☐	Refer as KDB 558074, clause 8.2 Option 2 for 6 dB bandwidth measurement.
☐	Refer as ANSI C63.10, clause 6.9.3 for occupied bandwidth testing.
☐	Refer as RSS-Gen, clause 6.6 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.		

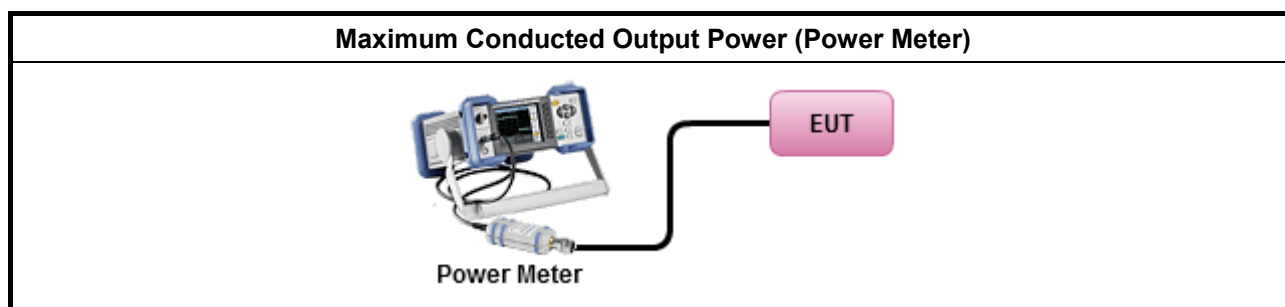
3.3.2 Measuring Instruments

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 9.1.1 Option 1 (RBW ≥ EBW method).
☐	Refer as KDB 558074, clause 9.1.2 Option 2 (integrated band power method)
☐	Refer as KDB 558074, clause 9.1.3 Option 3 (peak power meter for VBW ≥ DTS BW)
Maximum Average Conducted Output Power	
Duty cycle ≥ 98%	
☐	Refer as KDB 558074, clause 9.2.2.4 Method AVGSA-2 (spectral trace averaging).
Duty cycle < 98%	
☐	Refer as KDB 558074, clause 9.2.2.5 Method AVGSA-2 Alt. (slow sweep speed)
RF power meter and average over on/off periods with duty factor or gated trigger	
☒	Refer as KDB 558074, clause 9.2.3.1 Method AVGPM (using an RF average power meter).
For conducted measurement.	
If the EUT supports multiple transmit chains using options given below: Refer as KDB 662911, In-band power measurements. Using the measure-and-sum approach, measured all transmit ports individually. Sum the power (in linear power units e.g., mW) of all ports for each individual sample and save them.	
If multiple transmit chains, EIRP calculation could be following as methods: $P_{total} = P_1 + P_2 + \dots + P_n$ (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

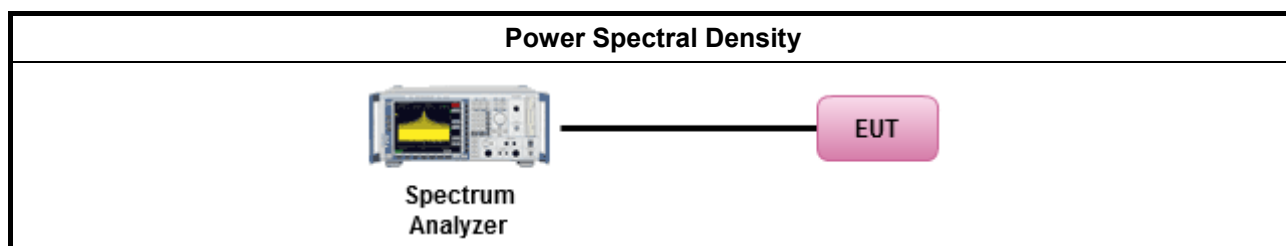
3.4.2 Measuring Instruments

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 10.2 Method PKPSD (RBW=3-100kHz; Detector=peak).
▪	For conducted measurement.
▪	If The EUT supports multiple transmit chains using options given below:
▪	Measure and sum the spectra across the outputs. Refer as KDB 662911, In-band power spectral density (PSD). Sample all transmit ports simultaneously using a spectrum analyzer for each transmit port. Where the trace bin-by-bin of each transmit port summing can be performed. (i.e., in the first spectral bin of output 1 is summed with that in the first spectral bin of output 2 and that from the first spectral bin of output 3, and so on up to the NTX output to obtain the value for the first frequency bin of the summed spectrum.). Add up the amplitude (power) values for the different transmit chains and use this as the new data trace.

3.4.4 Test Setup



3.4.5 Test Result of Power Spectral Density

Refer as Appendix D

3.5 Emissions in Non-restricted Frequency Bands

3.5.1 Emissions in Non-restricted Frequency Bands Limit

Un-restricted Band Emissions Limit	
RF output power procedure	Limit (dB)
Peak output power procedure	20
Average output power procedure	30
Note 1: If the peak output power procedure is used to measure the fundamental emission power to demonstrate compliance to requirements, then the peak conducted output power measured within any 100 kHz outside the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum measured in-band peak PSD level. Note 2: If the average output power procedure is used to measure the fundamental emission power to demonstrate compliance to requirements, then the power in any 100 kHz outside of the authorized frequency band shall be attenuated by at least 30 dB relative to the maximum measured in-band average PSD level.	

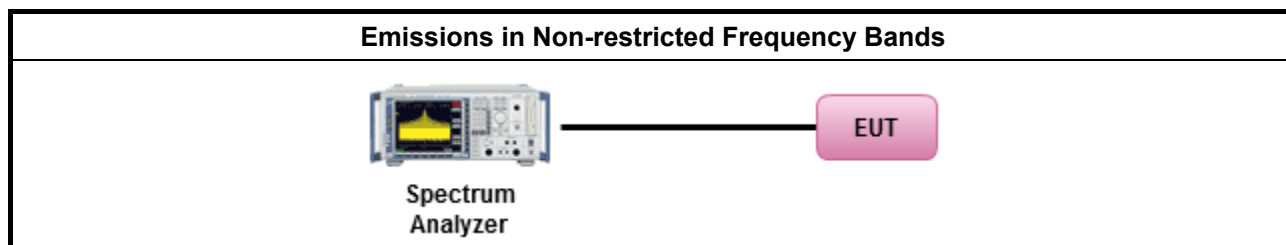
3.5.2 Measuring Instruments

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

3.5.3 Test Procedures

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

3.5.4 Test Setup



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.

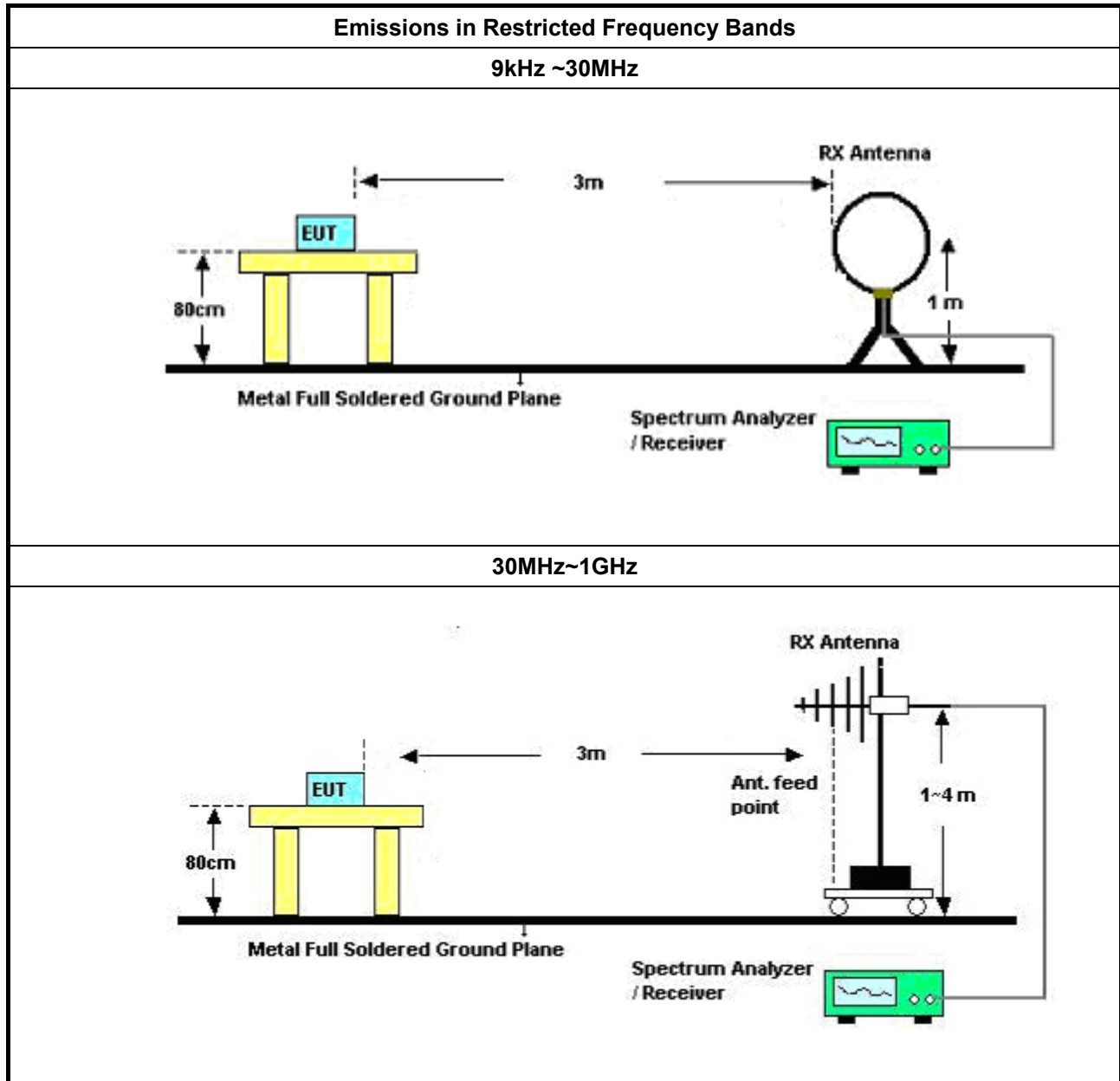
3.6.2 Measuring Instruments

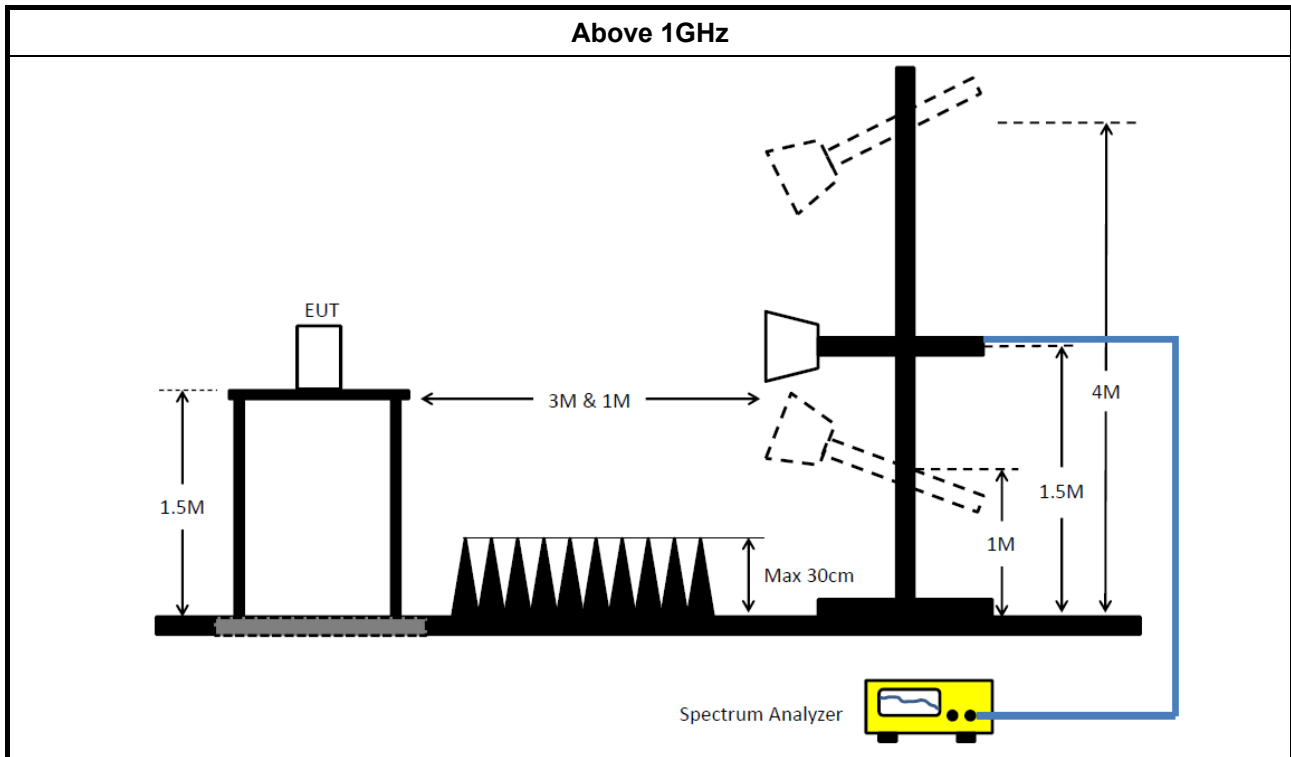
Refer a test equipment and calibration data table in this test report.

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 12 for unwanted emissions into restricted bands.
	☒ Refer as KDB 558074, clause 12.2.5.3 (ANSI C63.10, clause 4.1.4.2.3), Reduced VBW $\geq$ 1/T.
	☒ Refer as KDB 558074, clause 12.2.4 measurement procedure peak limit.
For the transmitter band-edge emissions shall be measured using following options below:	
	Refer as KDB 558074 clause 13.1, When the performing peak or average radiated measurements, emissions within 2 MHz of the authorized band edge may be measured using the marker-delta method described below.
	Refer as KDB 558074, clause 13.2 (ANSI C63.10, clause 6.10.6) for marker-delta method for band-edge measurements.
	Refer as KDB 558074, clause 13.3 for narrower resolution bandwidth (100kHz) using the band power and summing the spectral levels (i.e., 1 MHz).
For conducted and cabinet radiation measurement, refer as KDB 558074, clause 12.2.2.	
	For conducted unwanted emissions into restricted bands (absolute emission limits). Devices with multiple transmit chains using options given below: (1) Measure and sum the spectra across the outputs or (2) Measure and add 10 log(N) dB
	For KDB 662911 The methodology described here may overestimate array gain, thereby resulting in apparent failures to satisfy the out-of-band limits even if the device is actually compliant. In such cases, compliance may be demonstrated by performing radiated tests around the frequencies at which the apparent failures occurred.

3.6.4 Test Setup





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	29/Apr/2017	28/Apr/2018
LISN	SCHWARZBECK MESS-ELEKTRONIK	NSLK 8127	8127-477	9kHz ~ 30MHz	14/Feb/2017	13/Feb/2018
RF Cable-CON	HUBER+SUHNER	RG213/U	07611832020001	9kHz ~ 30MHz	06/Oct/2017	05/Oct/2018
AC POWER	APC	AFC-11005G	F310050055	47Hz~63Hz 5~300V	NCR	NCR
Impuls Begrenzer Pulse Limiter	R&S	ESH3-Z2	100921	10 kHz ~ 30 MHz	12/Oct/2017	11/Oct/2018

NCR : Non-Calibration Require

Instrument for Radiated Test

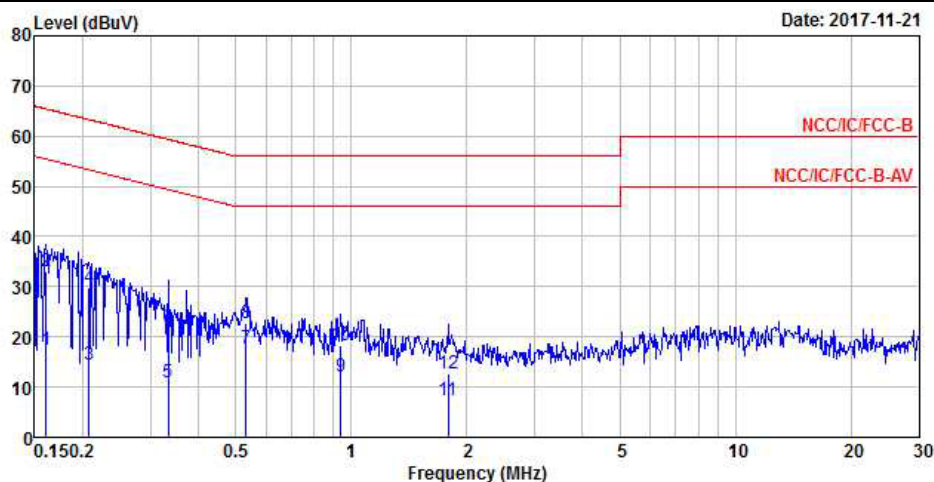
Instrument	Manufacturer	Model No.	Serial No.	Spec.	Calibration Date	Calibration Due Date
3m Semi Anechoic Chamber	TDK	SAC-3M	03CH09-HY	30MHz ~ 1GHz	25/Apr/2017	24/Apr/2018
3m Semi Anechoic Chamber	TDK	SAC-3M	03CH09-HY	1GHz ~ 18GHz	28/Jun/2017	27/Jun/2018
Amplifier	Agilent	8449B	3008A02096	1GHz ~ 26.5GHz	25/Apr/2017	24/Apr/2018
Amplifier	EMC	EMC9135	980232	9kHz~1GHz	25/Apr/2017	24/Apr/2018
Spectrum Analyzer	KEYSIGHT	N9010A	MY54200885	10Hz ~ 44GHz	20/Jul/2017	19/Jul/2018
Bilog Antenna	TESEQ	CBL 6111D	35418	30MHz~1GHz	09/Sep/2017	08/Sep/2018
Horn Antenna	SCHWARZBECK	BBHA 9120D	BBHA9120D 1534	1GHz~18GHz	28/Apr/2017	27/Apr/2018
Horn Antenna	SCHWARZBECK	BBHA9170	BBHA9170614	18GHz ~ 40GHz	06/Feb/2017	05/Feb/2018
Loop Antenna	TESTQ	HLA 6120	31244	9kHz~30 MHz	02/Mar/2017	01/Mar/2018
RF Cable-R03m	Jye Bao	RG142	CB021	9kHz ~ 1GHz	02/Feb/2017	01/Feb/2018
RF Cable-high	Jye Bao	RG142	03CH09-HY	1GHz ~ 40GHz	02/Feb/2017	01/Feb/2018
Receiver	R&S	ESR3	102052	9kHz ~ 3.6GHz	29/Apr/2017	28/Apr/2018

**Instrument for Conducted Test**

Instrument	Manufacturer	Model No.	Serial No.	Spec.	Calibration Date	Calibration Due Date
Spectrum Analyzer	R&S	FSV 40	101013	9kHz~40GHz	30/Dec/2016	29/Dec/2017
Signal Generator	R&S	SMR40	100116	10MHz ~ 40GHz	27/Jul/2017	26/Jul/2018
Power Sensor	Anritsu	MA2411B	0917017	300MHz ~ 40GHz	10/Feb/2017	09/Feb/2018
Power Meter	Anritsu	ML2495A	0949003	300MHz ~ 40GHz	10/Feb/2017	09/Feb/2018
RF Cable-0.2m	HUBER+SUHNER	SUCOFLEX_104	MY10709/4	30MHz ~ 26.5GHz	25/Aug/2017	24/Aug/2018
RF Cable-0.2m	HUBER+SUHNER	SUCOFLEX_104	MY10712/4	30MHz ~ 26.5GHz	25/Aug/2017	24/Aug/2018
RF Cable-0.5m	HUBER+SUHNER	SUCOFLEX_104	MY10713/4	30MHz ~ 26.5GHz	25/Aug/2017	24/Aug/2018

AC Power-line Conducted Emissions Result

Operating Mode	1	Power Phase	Neutral
Operating Function	Adapter mode		

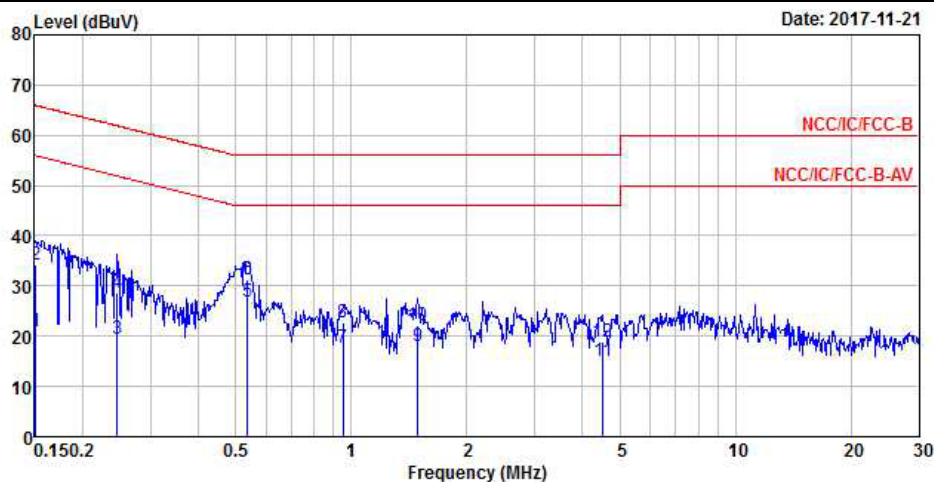


	Freq	Level	Over	Limit	Read	LISN	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
			dB	dBuV	dBuV	dB	dB	
1	0.16070	17.40	-38.03	55.43	17.34	0.03	0.03	Average
2	0.16070	33.14	-32.29	65.43	33.08	0.03	0.03	QP
3	0.20723	14.39	-38.93	53.32	14.36	0.03	0.00	Average
4	0.20723	29.94	-33.38	63.32	29.91	0.03	0.00	QP
5	0.33385	11.06	-38.29	49.35	10.96	0.03	0.07	Average
6	0.33385	21.71	-37.64	59.35	21.61	0.03	0.07	QP
7 Max	0.53215	17.60	-28.40	46.00	17.49	0.04	0.07	Average
8	0.53215	22.81	-33.19	56.00	22.70	0.04	0.07	QP
9	0.93810	12.03	-33.97	46.00	11.97	0.05	0.01	Average
10	0.93810	18.17	-37.83	56.00	18.11	0.05	0.01	QP
11	1.79050	7.40	-38.60	46.00	7.34	0.06	0.00	Average
12	1.79050	12.56	-43.44	56.00	12.50	0.06	0.00	QP

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

AC Power-line Conducted Emissions Result

Operating Mode	1	Power Phase	Line
Operating Function	Adapter mode		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.15080	20.94	-35.02	55.96	20.83	0.07	0.04	Average
2	0.15080	34.26	-31.70	65.96	34.15	0.07	0.04	QP
3	0.24552	19.38	-32.53	51.91	19.28	0.07	0.03	Average
4	0.24552	28.64	-33.27	61.91	28.54	0.07	0.03	QP
5 Max	0.53782	26.89	-19.11	46.00	26.74	0.08	0.07	Average
6	0.53782	31.27	-24.73	56.00	31.12	0.08	0.07	QP
7	0.95313	17.74	-28.26	46.00	17.64	0.09	0.01	Average
8	0.95313	22.68	-33.32	56.00	22.58	0.09	0.01	QP
9	1.48743	18.13	-27.87	46.00	18.02	0.11	0.00	Average
10	1.48743	22.00	-34.00	56.00	21.89	0.11	0.00	QP
11	4.52536	15.19	-30.81	46.00	14.90	0.19	0.10	Average
12	4.52536	19.04	-36.96	56.00	18.75	0.19	0.10	QP

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

Summary

Mode	Max-N dB (Hz)	Max-OBW (Hz)	ITU-Code	Min-N dB (Hz)	Min-OBW (Hz)
2.4-2.4835GHz	-	-	-	-	-
BT-LE(1Mbps)	691.25k	1.049M	1M05F1D	678.75k	1.047M

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

Min-N dB = Minimum 6dB down bandwidth; **Min-OBW** = Minimum 99% occupied bandwidth;

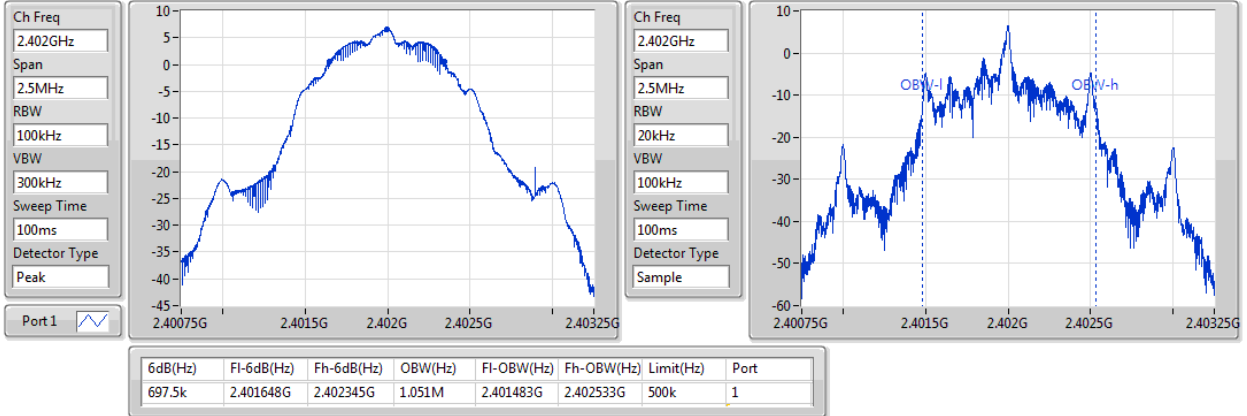
Result

Mode	Result	Limit (Hz)	Port 1-N dB (Hz)	Port 1-OBW (Hz)
BT-LE(1Mbps)	-	-	-	-
2402MHz_TnomVnom	Pass	500k	691.25k	1.047M
2440MHz_TnomVnom	Pass	500k	685k	1.049M
2480MHz_TnomVnom	Pass	500k	678.75k	1.048M

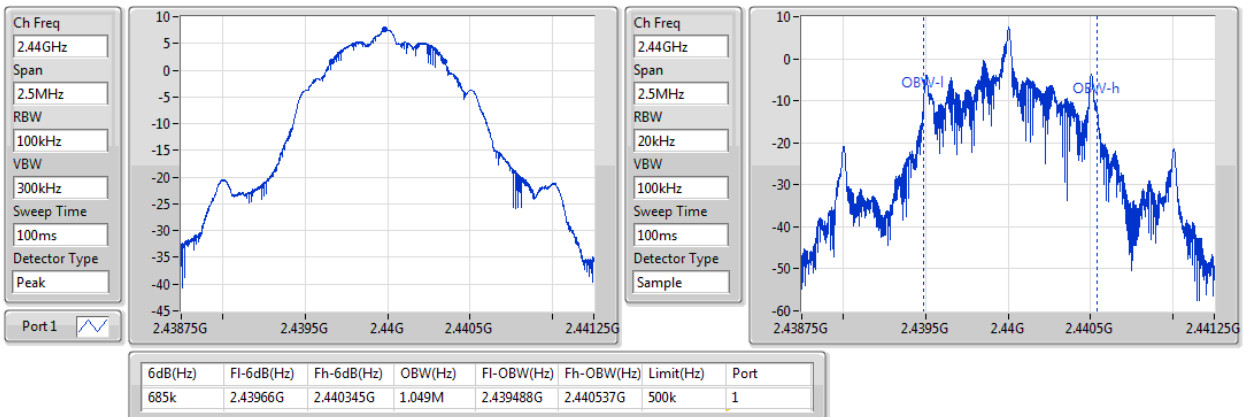
Port X-N dB = Port X 6dB down bandwidth; **Port X-OBW** = Port X 99% occupied bandwidth;

BT-LE(1Mbps)
EBW
2402MHz

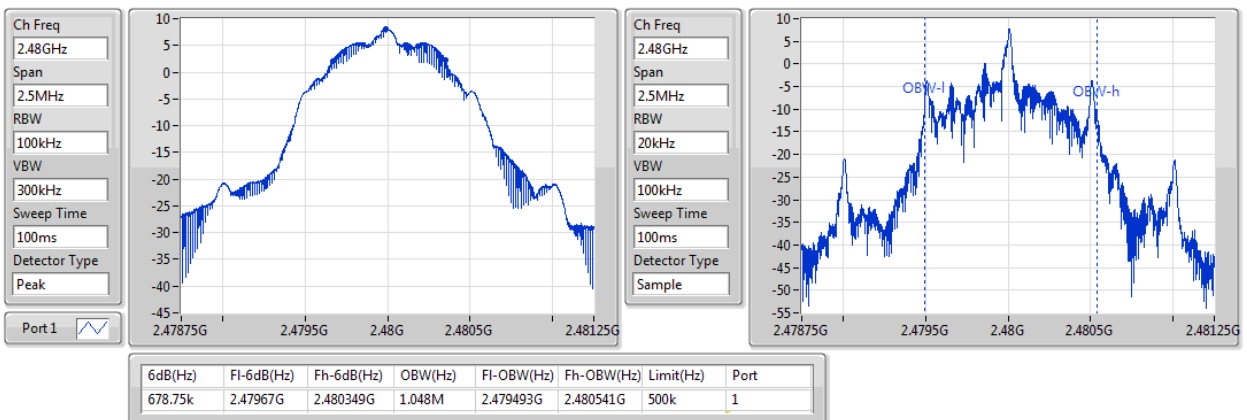
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BT-LE(1Mbps)
EBW
2440MHz

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BT-LE(1Mbps)
EBW
2480MHz

21/11/2017



Summary

Mode	Power	Power
	(dBm)	(W)
2.4-2.4835GHz	-	-
BT-LE(1Mbps)	8.13	0.00650

Result

Mode	Result	Gain (dBi)	Power (dBm)	Power Limit (dBm)
BT-LE(1Mbps)	-	-	-	-
2402MHz_TnomVnom	Pass	1.22	7.22	30.00
2440MHz_TnomVnom	Pass	1.22	7.71	30.00
2480MHz_TnomVnom	Pass	1.22	8.13	30.00

**Summary**

Mode	PD (dBm/RBW)
2.4-2.4835GHz	-
BT-LE(1Mbps)	5.60

RBW=3kHz.

Result

Mode	Result	Gain (dBi)	PD (dBm/RBW)	PD Limit (dBm/RBW)
BT-LE(1Mbps)	-	-	-	-
2402MHz_TnomVnom	Pass	1.22	5.60	8.00
2440MHz_TnomVnom	Pass	1.22	4.53	8.00
2480MHz_TnomVnom	Pass	1.22	1.12	8.00

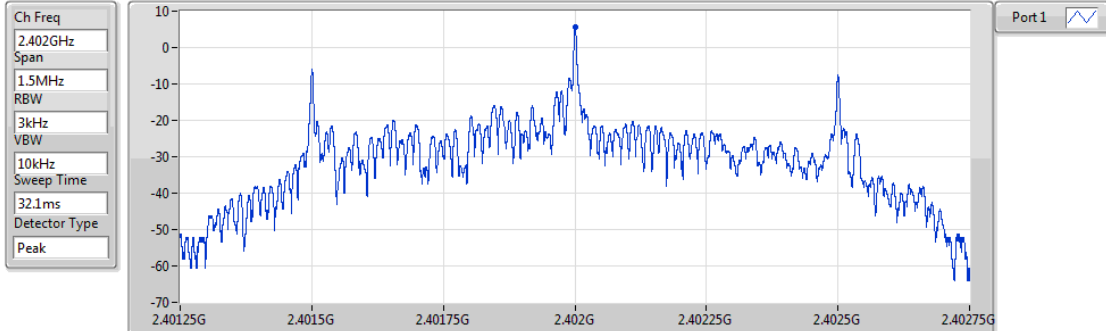
RBW=3kHz.

BT-LE(1Mbps)

PSD

2402MHz

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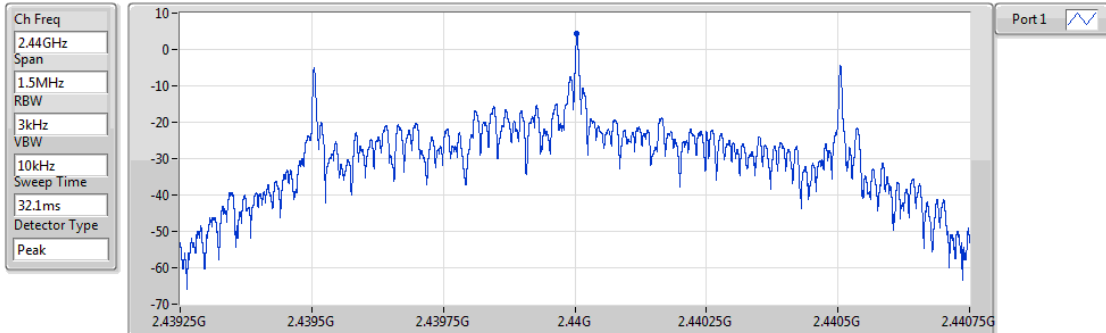
Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
5.60	5.60	5.60

BT-LE(1Mbps)

PSD

2440MHz

21/11/2017



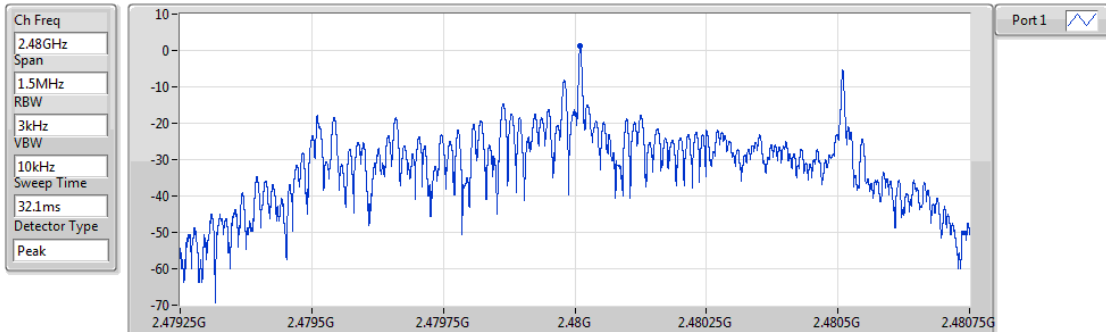
Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
4.53	4.53	4.53

BT-LE(1Mbps)

PSD

2480MHz

21/11/2017



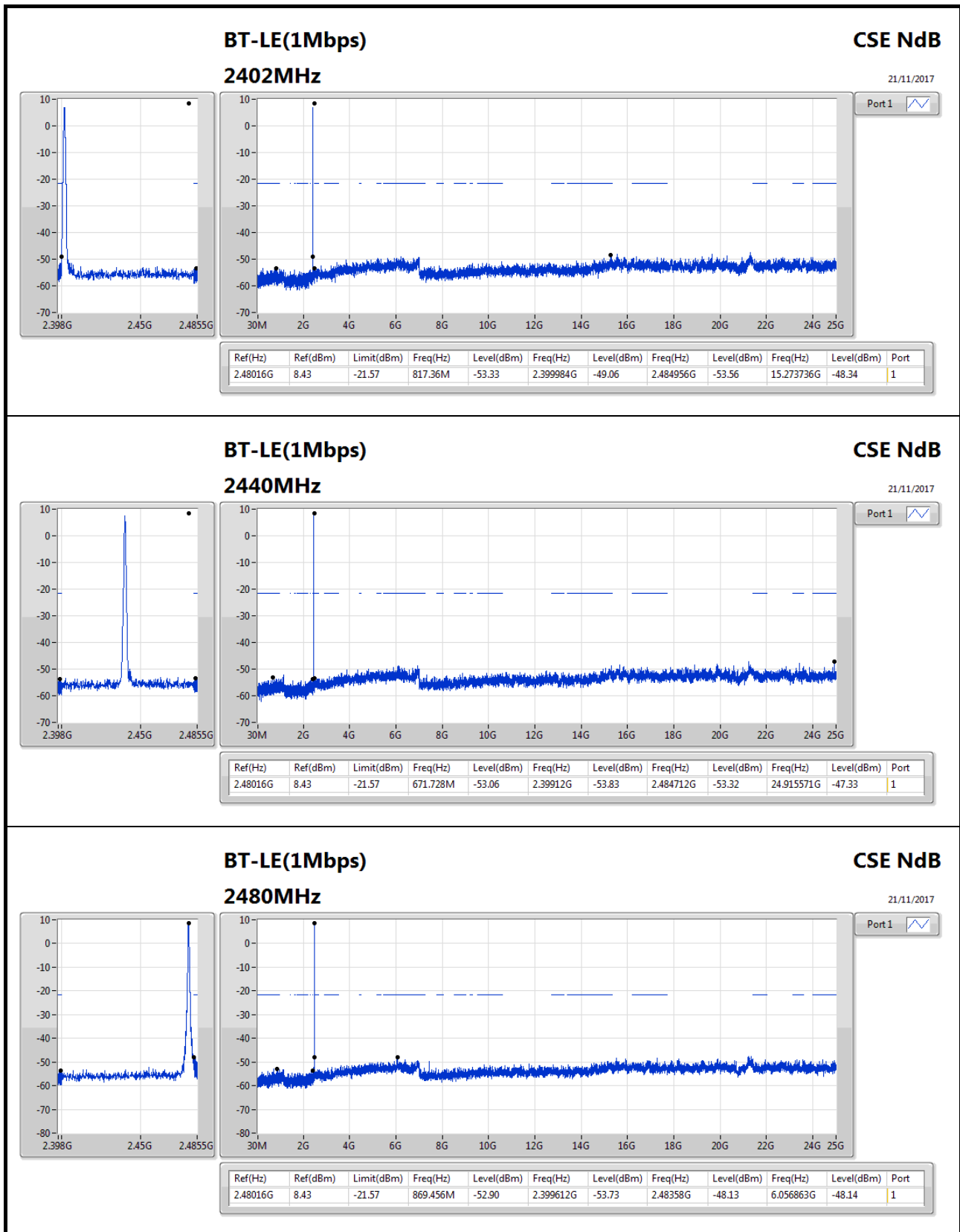
Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
1.12	1.12	1.12

Summary

Mode	Result	Ref (Hz)	Ref (dBm)	Limit (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Port
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-	-	-
BT-LE(1Mbps)	Pass	2.48016G	8.43	-21.57	671.728M	-53.06	2.39912G	-53.83	2.484712G	-53.32	24.915571G	-47.33	1

Result

Mode	Result	Ref (Hz)	Ref (dBm)	Limit (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Port
BT-LE(1Mbps)	-	-	-	-	-	-	-	-	-	-	-	-	-
2402MHz_TnomVnom	Pass	2.48016G	8.43	-21.57	817.36M	-53.33	2.399984G	-49.06	2.484956G	-53.56	15.273736G	-48.34	1
2440MHz_TnomVnom	Pass	2.48016G	8.43	-21.57	671.728M	-53.06	2.39912G	-53.83	2.484712G	-53.32	24.915571G	-47.33	1
2480MHz_TnomVnom	Pass	2.48016G	8.43	-21.57	869.456M	-52.90	2.399612G	-53.73	2.48358G	-48.13	6.056863G	-48.14	1



Summary

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-	-
BT-LE(1Mbps)	Pass	PK	200.72M	40.31	43.50	-3.19	-19.86	3	Vertical	0	1.00	-

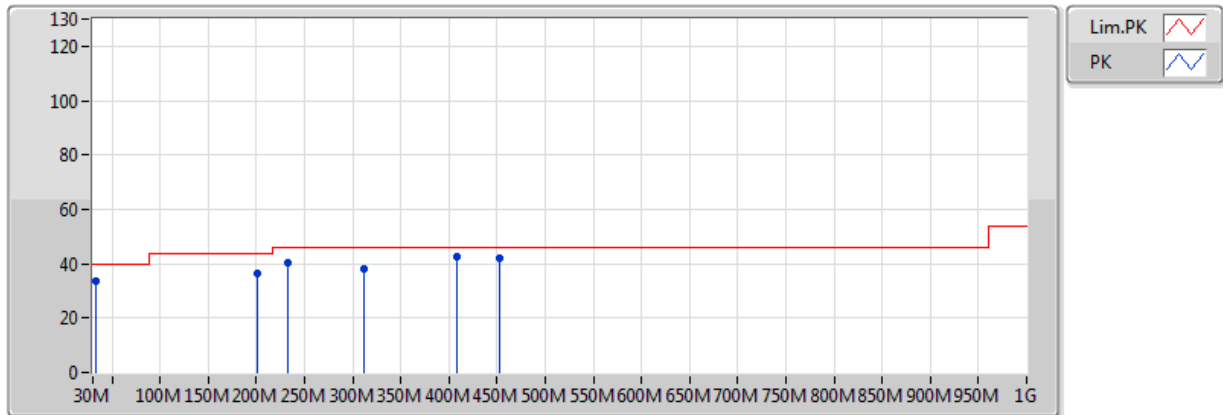
Result

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
BT-LE(1Mbps)	-	-	-	-	-	-	-	-	-	-	-	-
2440MHz	Pass	PK	33.88M	33.68	40.00	-6.32	-14.67	3	Vertical	360	1.00	-
2440MHz	Pass	PK	62.98M	34.46	40.00	-5.54	-24.76	3	Vertical	0	1.00	-
2440MHz	Pass	PK	200.72M	36.20	43.50	-7.30	-19.86	3	Vertical	360	1.00	-
2440MHz	Pass	PK	200.72M	40.31	43.50	-3.19	-19.86	3	Vertical	0	1.00	-
2440MHz	Pass	PK	231.76M	40.61	46.00	-5.39	-18.32	3	Vertical	360	1.00	-
2440MHz	Pass	PK	288.02M	41.77	46.00	-4.23	-15.38	3	Vertical	0	1.00	-
2440MHz	Pass	PK	311.3M	38.07	46.00	-7.93	-14.92	3	Vertical	360	1.00	-
2440MHz	Pass	PK	311.3M	40.90	46.00	-5.10	-14.92	3	Vertical	0	1.00	-
2440MHz	Pass	PK	408.3M	42.54	46.00	-3.46	-11.85	3	Vertical	360	1.00	-
2440MHz	Pass	PK	408.3M	42.42	46.00	-3.58	-11.85	3	Vertical	0	1.00	-
2440MHz	Pass	PK	450.98M	41.37	46.00	-4.63	-10.86	3	Vertical	0	1.00	-
2440MHz	Pass	PK	452.92M	41.92	46.00	-4.08	-10.82	3	Vertical	360	1.00	-

BT-LE(1Mbps)

2440MHz_Adapter

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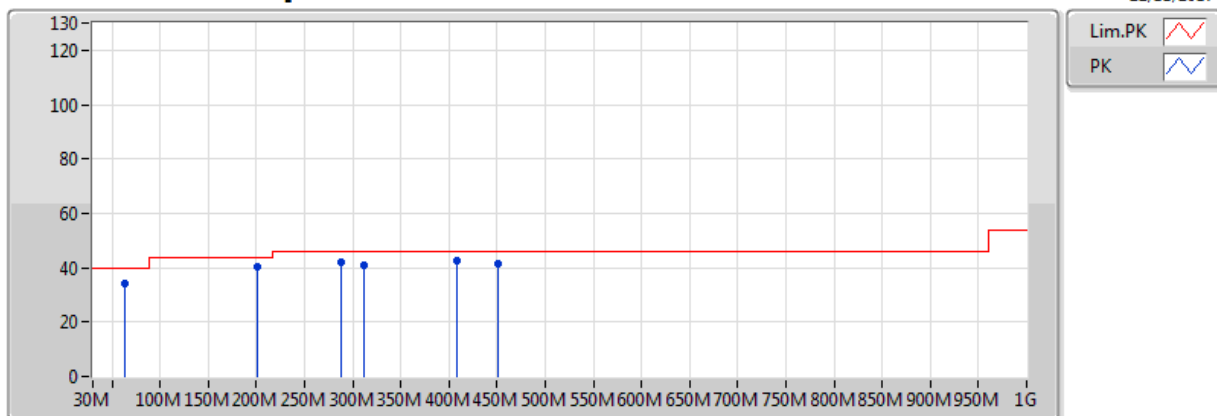


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments				
PK	33.88M	33.68	40.00	-6.32	-14.67	3	Vertical	360	1.00	-				
PK	200.72M	36.20	43.50	-7.30	-19.86	3	Vertical	360	1.00	-				
PK	231.76M	40.61	46.00	-5.39	-18.32	3	Vertical	360	1.00	-				
PK	311.3M	38.07	46.00	-7.93	-14.92	3	Vertical	360	1.00	-				
PK	408.3M	42.54	46.00	-3.46	-11.85	3	Vertical	360	1.00	-				
PK	452.92M	41.92	46.00	-4.08	-10.82	3	Vertical	360	1.00	-				

BT-LE(1Mbps)

2440MHz_Adapter

22/11/2017



Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments				
PK	62.98M	34.46	40.00	-5.54	-24.76	3	Vertical	0	1.00	-				
PK	200.72M	40.31	43.50	-3.19	-19.86	3	Vertical	0	1.00	-				
PK	288.02M	41.77	46.00	-4.23	-15.38	3	Vertical	0	1.00	-				
PK	311.3M	40.90	46.00	-5.10	-14.92	3	Vertical	0	1.00	-				
PK	408.3M	42.42	46.00	-3.58	-11.85	3	Vertical	0	1.00	-				
PK	450.98M	41.37	46.00	-4.63	-10.86	3	Vertical	0	1.00	-				

Summary

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-	-
BT-LE(1Mbps)	Pass	AV	2.4842G	50.36	54.00	-3.64	33.10	3	Horizontal	13	1.00	-

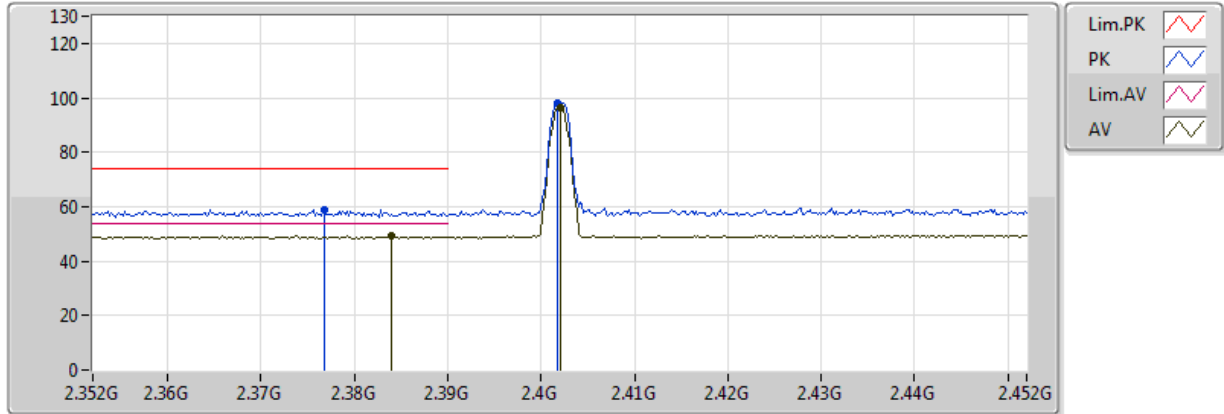
Result

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
BT-LE(1Mbps)	-	-	-	-	-	-	-	-	-	-	-	-
2402MHz	Pass	AV	2.39G	49.32	54.00	-4.68	32.72	3	Horizontal	29	1.01	-
2402MHz	Pass	AV	2.402G	100.15	Inf	-Inf	32.77	3	Horizontal	29	1.01	-
2402MHz	Pass	PK	2.3842G	59.11	74.00	-14.89	32.70	3	Horizontal	29	1.01	-
2402MHz	Pass	PK	2.4016G	101.92	Inf	-Inf	32.77	3	Horizontal	29	1.01	-
2402MHz	Pass	AV	2.384G	49.22	54.00	-4.78	32.70	3	Vertical	353	3.36	-
2402MHz	Pass	AV	2.402G	96.23	Inf	-Inf	32.77	3	Vertical	353	3.36	-
2402MHz	Pass	PK	2.3768G	58.95	74.00	-15.05	32.67	3	Vertical	353	3.36	-
2402MHz	Pass	PK	2.4018G	97.87	Inf	-Inf	32.77	3	Vertical	353	3.36	-
2402MHz	Pass	AV	4.804G	36.37	54.00	-17.63	4.10	3	Horizontal	354	1.50	-
2402MHz	Pass	PK	4.804G	47.44	74.00	-26.56	4.10	3	Horizontal	354	1.50	-
2402MHz	Pass	AV	4.804G	37.91	54.00	-16.09	4.10	3	Vertical	0	3.34	-
2402MHz	Pass	PK	4.804G	48.79	74.00	-25.21	4.10	3	Vertical	0	3.34	-
2440MHz	Pass	AV	2.3492G	48.88	54.00	-5.12	32.56	3	Horizontal	16	1.00	-
2440MHz	Pass	AV	2.44G	103.80	Inf	-Inf	32.92	3	Horizontal	16	1.00	-
2440MHz	Pass	AV	2.4984G	49.92	54.00	-4.08	33.15	3	Horizontal	16	1.00	-
2440MHz	Pass	PK	2.3644G	58.68	74.00	-15.32	32.62	3	Horizontal	16	1.00	-
2440MHz	Pass	PK	2.4396G	105.41	Inf	-Inf	32.92	3	Horizontal	16	1.00	-
2440MHz	Pass	PK	2.4936G	59.22	74.00	-14.78	33.13	3	Horizontal	16	1.00	-
2440MHz	Pass	AV	2.3788G	48.99	54.00	-5.01	32.68	3	Vertical	4	3.35	-
2440MHz	Pass	AV	2.44G	101.21	Inf	-Inf	32.92	3	Vertical	4	3.35	-
2440MHz	Pass	AV	2.4996G	49.76	54.00	-4.24	33.16	3	Vertical	4	3.35	-
2440MHz	Pass	PK	2.3796G	58.96	74.00	-15.04	32.68	3	Vertical	4	3.35	-
2440MHz	Pass	PK	2.4396G	102.82	Inf	-Inf	32.92	3	Vertical	4	3.35	-
2440MHz	Pass	PK	2.4856G	58.79	74.00	-15.21	33.10	3	Vertical	4	3.35	-
2440MHz	Pass	AV	4.88G	36.35	54.00	-17.65	4.29	3	Horizontal	343	1.02	-
2440MHz	Pass	PK	4.88G	45.41	74.00	-28.59	4.29	3	Horizontal	343	1.02	-
2440MHz	Pass	AV	4.88G	38.80	54.00	-15.20	4.29	3	Vertical	359	2.75	-
2440MHz	Pass	PK	4.88G	46.34	74.00	-27.66	4.29	3	Vertical	359	2.75	-
2480MHz	Pass	AV	2.48G	103.72	Inf	-Inf	33.08	3	Horizontal	13	1.00	-
2480MHz	Pass	AV	2.4842G	50.36	54.00	-3.64	33.10	3	Horizontal	13	1.00	-
2480MHz	Pass	PK	2.4798G	105.49	Inf	-Inf	33.08	3	Horizontal	13	1.00	-
2480MHz	Pass	PK	2.4836G	62.24	74.00	-11.76	33.09	3	Horizontal	13	1.00	-
2480MHz	Pass	AV	2.48G	97.95	Inf	-Inf	33.08	3	Vertical	339	3.29	-
2480MHz	Pass	AV	2.4994G	49.89	54.00	-4.11	33.16	3	Vertical	339	3.29	-
2480MHz	Pass	PK	2.4798G	99.67	Inf	-Inf	33.08	3	Vertical	339	3.29	-
2480MHz	Pass	PK	2.4994G	59.32	74.00	-14.68	33.16	3	Vertical	339	3.29	-
2480MHz	Pass	AV	4.96G	42.32	54.00	-11.68	4.49	3	Horizontal	340	1.02	-
2480MHz	Pass	PK	4.96G	49.37	74.00	-24.63	4.49	3	Horizontal	340	1.02	-
2480MHz	Pass	AV	4.96G	44.64	54.00	-9.36	4.49	3	Vertical	358	1.03	-
2480MHz	Pass	PK	4.96G	51.26	74.00	-22.74	4.49	3	Vertical	358	1.03	-

BT-LE(1Mbps)

2402MHz_TX

21/11/2017

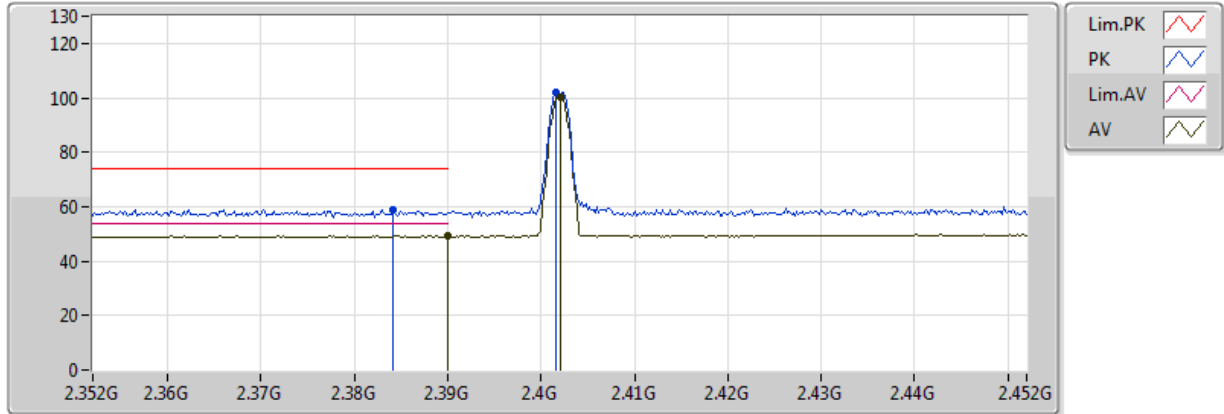


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
AV	2.384G	49.22	54.00	-4.78	32.70	3	Vertical	353	3.36	-
AV	2.402G	96.23	Inf	-Inf	32.77	3	Vertical	353	3.36	-
PK	2.3768G	58.95	74.00	-15.05	32.67	3	Vertical	353	3.36	-
PK	2.4018G	97.87	Inf	-Inf	32.77	3	Vertical	353	3.36	-

BT-LE(1Mbps)

2402MHz_TX

21/11/2017

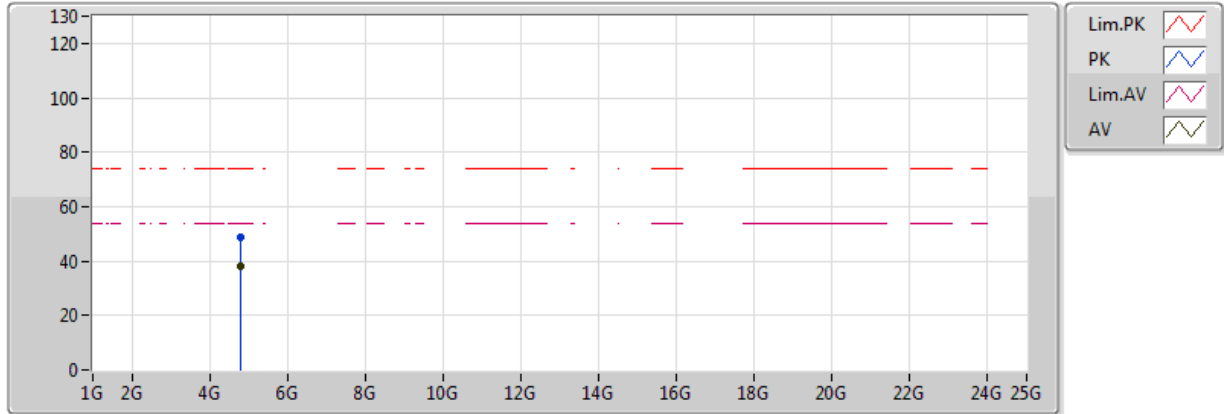


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments				
AV	2.39G	49.32	54.00	-4.68	32.72	3	Horizontal	29	1.01	-				
AV	2.402G	100.15	Inf	-Inf	32.77	3	Horizontal	29	1.01	-				
PK	2.3842G	59.11	74.00	-14.89	32.70	3	Horizontal	29	1.01	-				
PK	2.4016G	101.92	Inf	-Inf	32.77	3	Horizontal	29	1.01	-				

BT-LE(1Mbps)

2402MHz_TX

21/11/2017

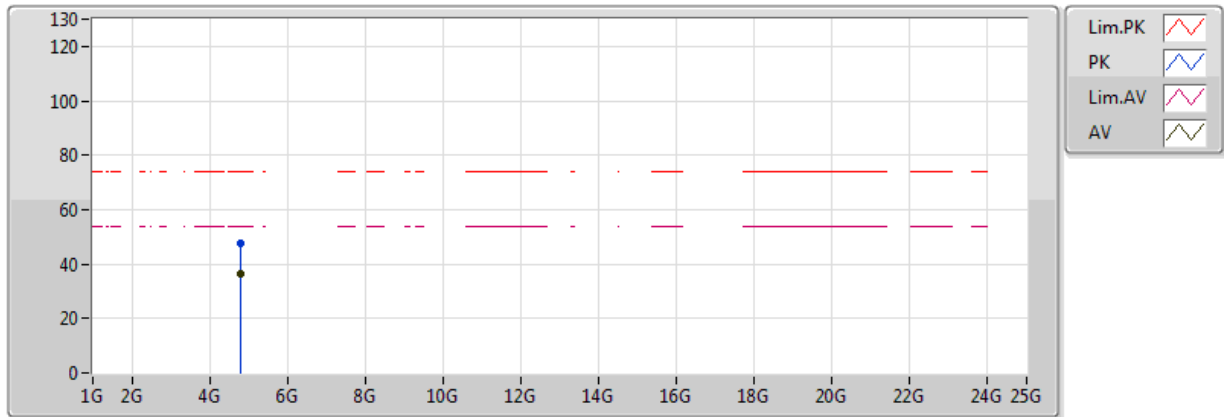


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments				
AV	4.804G	37.91	54.00	-16.09	4.10	3	Vertical	0	3.34	-				
PK	4.804G	48.79	74.00	-25.21	4.10	3	Vertical	0	3.34	-				

BT-LE(1Mbps)

2402MHz_TX

21/11/2017

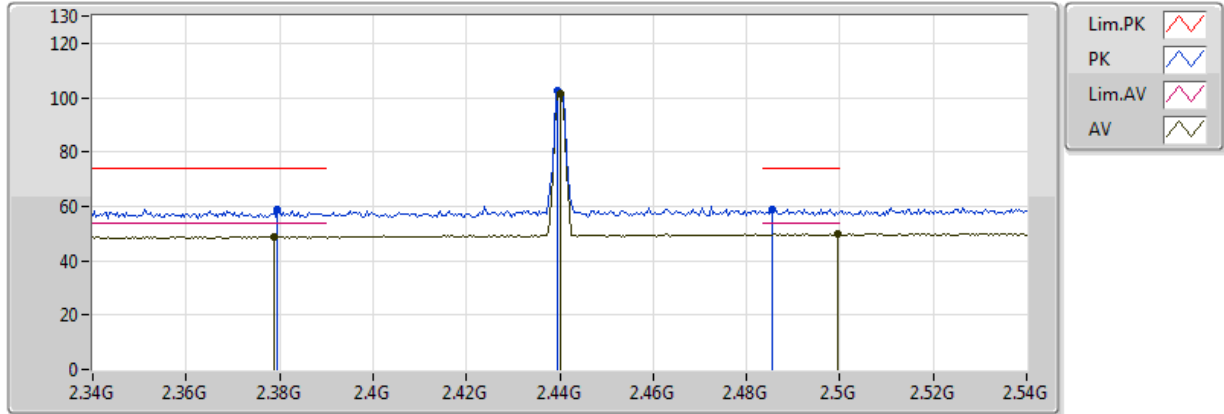


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments				
AV	4.804G	36.37	54.00	-17.63	4.10	3	Horizontal	354	1.50	-				
PK	4.804G	47.44	74.00	-26.56	4.10	3	Horizontal	354	1.50	-				

BT-LE(1Mbps)

2440MHz_TX

21/11/2017

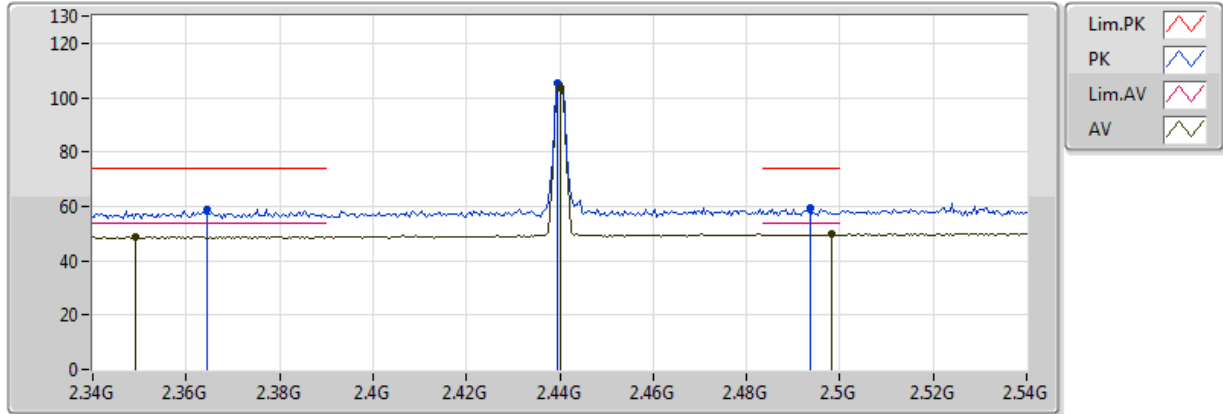


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
AV	2.3788G	48.99	54.00	-5.01	32.68	3	Vertical	4	3.35	-
AV	2.44G	101.21	Inf	-Inf	32.92	3	Vertical	4	3.35	-
AV	2.4996G	49.76	54.00	-4.24	33.16	3	Vertical	4	3.35	-
PK	2.3796G	58.96	74.00	-15.04	32.68	3	Vertical	4	3.35	-
PK	2.4396G	102.82	Inf	-Inf	32.92	3	Vertical	4	3.35	-
PK	2.4856G	58.79	74.00	-15.21	33.10	3	Vertical	4	3.35	-

BT-LE(1Mbps)

2440MHz_TX

21/11/2017

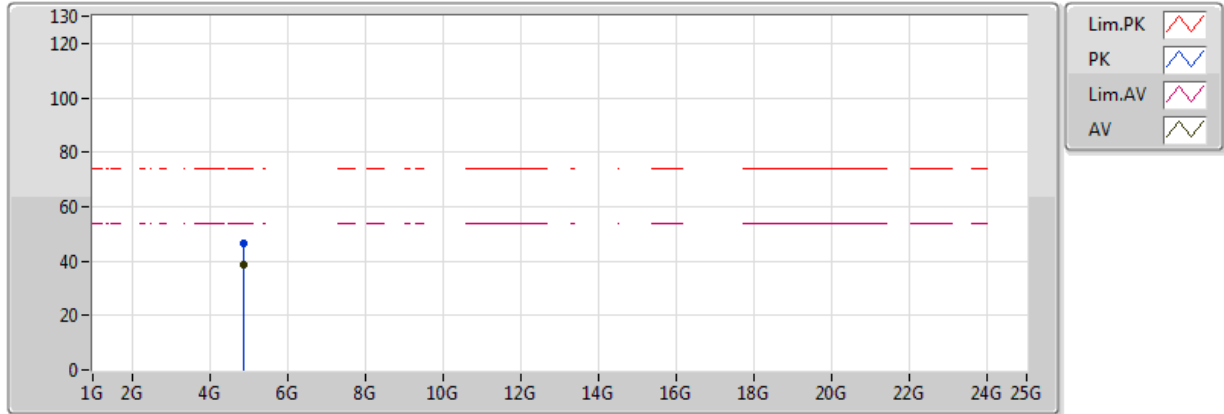


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
AV	2.3492G	48.88	54.00	-5.12	32.56	3	Horizontal	16	1.00	-
AV	2.44G	103.80	Inf	-Inf	32.92	3	Horizontal	16	1.00	-
AV	2.4984G	49.92	54.00	-4.08	33.15	3	Horizontal	16	1.00	-
PK	2.3644G	58.68	74.00	-15.32	32.62	3	Horizontal	16	1.00	-
PK	2.4396G	105.41	Inf	-Inf	32.92	3	Horizontal	16	1.00	-
PK	2.4936G	59.22	74.00	-14.78	33.13	3	Horizontal	16	1.00	-

BT-LE(1Mbps)

2440MHz_TX

21/11/2017

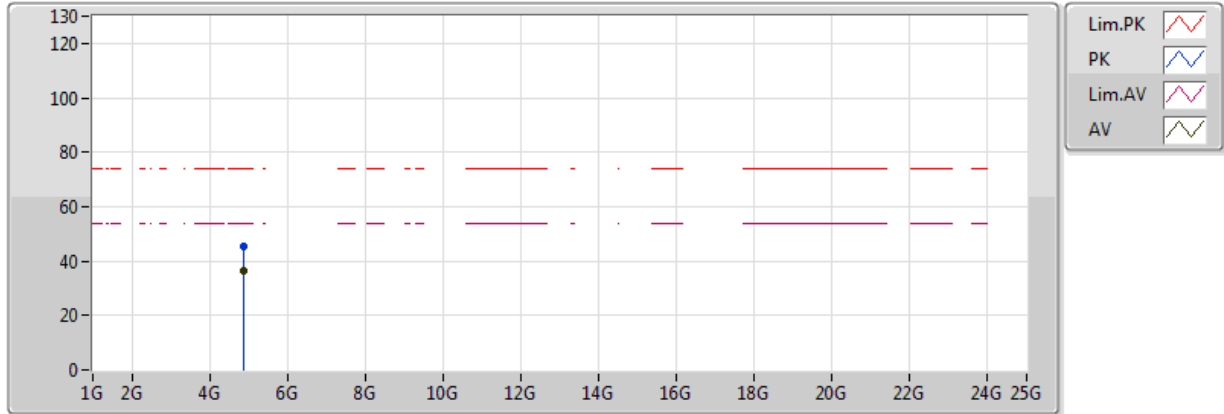


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments				
AV	4.88G	38.80	54.00	-15.20	4.29	3	Vertical	359	2.75	-				
PK	4.88G	46.34	74.00	-27.66	4.29	3	Vertical	359	2.75	-				

BT-LE(1Mbps)

2440MHz_TX

21/11/2017

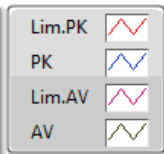
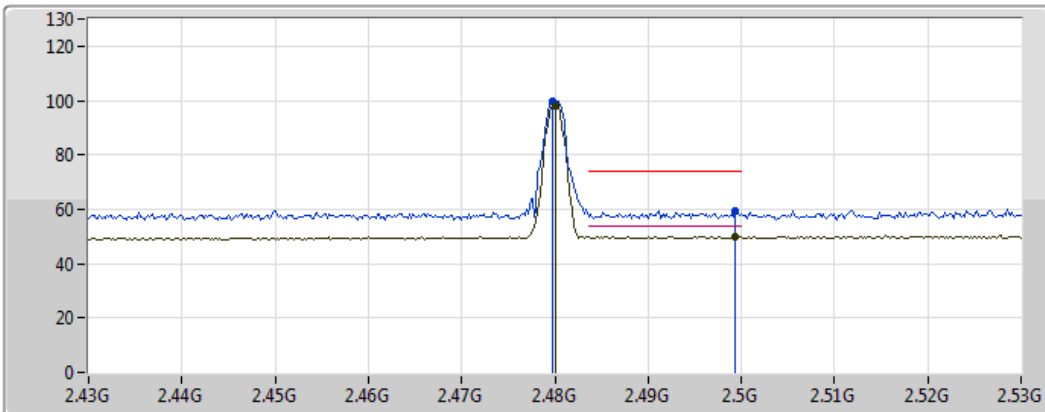


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments				
AV	4.88G	36.35	54.00	-17.65	4.29	3	Horizontal	343	1.02	-				
PK	4.88G	45.41	74.00	-28.59	4.29	3	Horizontal	343	1.02	-				

BT-LE(1Mbps)

2480MHz_TX

22/11/2017

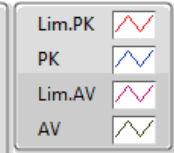
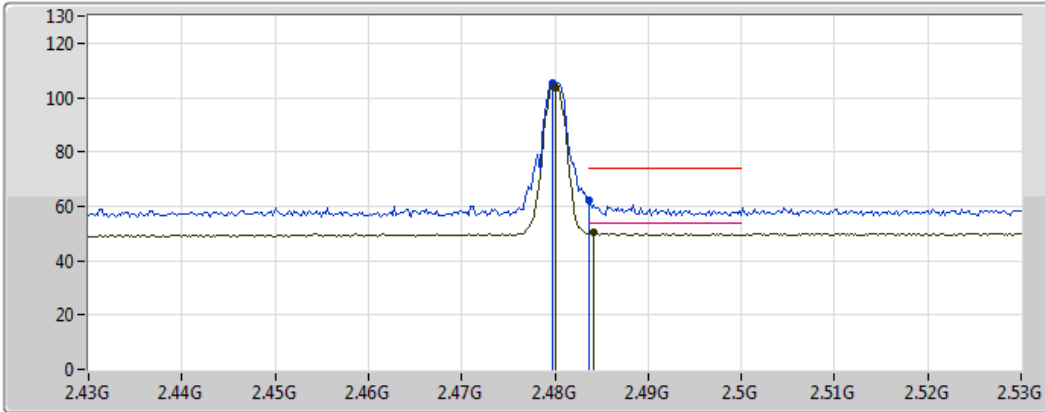


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments				
AV	2.48G	97.95	Inf	-Inf	33.08	3	Vertical	339	3.29	-				
AV	2.4994G	49.89	54.00	-4.11	33.16	3	Vertical	339	3.29	-				
PK	2.4798G	99.67	Inf	-Inf	33.08	3	Vertical	339	3.29	-				
PK	2.4994G	59.32	74.00	-14.68	33.16	3	Vertical	339	3.29	-				

BT-LE(1Mbps)

2480MHz_TX

22/11/2017

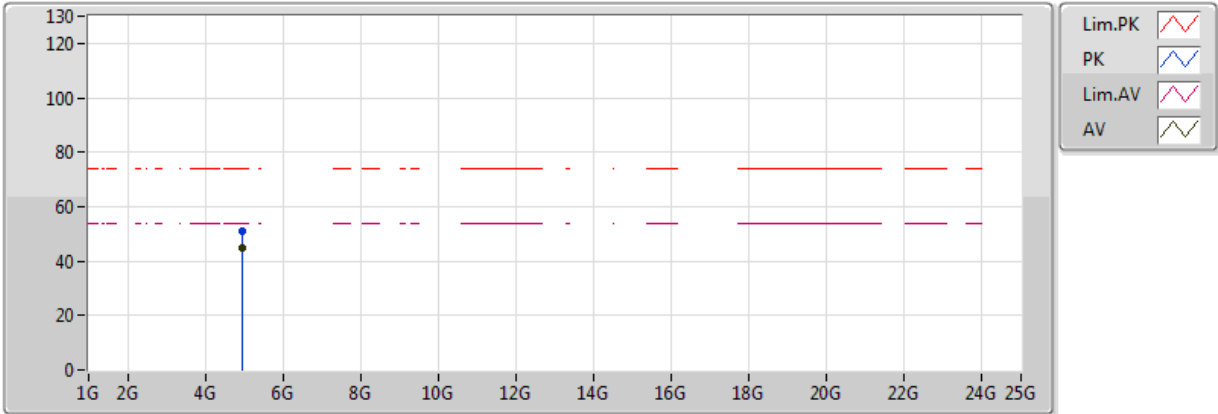


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments				
AV	2.48G	103.72	Inf	-Inf	33.08	3	Horizontal	13	1.00	-				
AV	2.4842G	50.36	54.00	-3.64	33.10	3	Horizontal	13	1.00	-				
PK	2.4798G	105.49	Inf	-Inf	33.08	3	Horizontal	13	1.00	-				
PK	2.4836G	62.24	74.00	-11.76	33.09	3	Horizontal	13	1.00	-				

BT-LE(1Mbps)

2480MHz_TX

22/11/2017

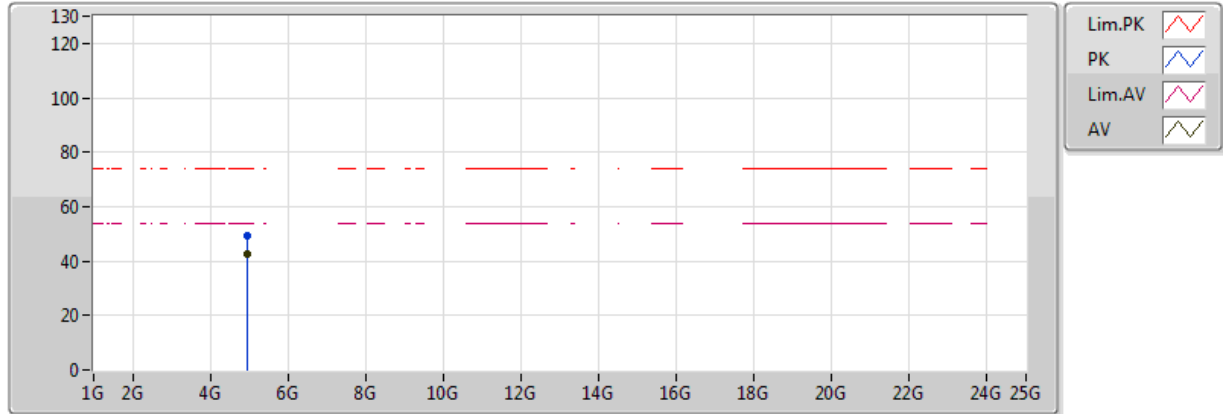


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
AV	4.96G	44.64	54.00	-9.36	4.49	3	Vertical	358	1.03	-
PK	4.96G	51.26	74.00	-22.74	4.49	3	Vertical	358	1.03	-

BT-LE(1Mbps)

2480MHz_TX

21/11/2017



Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments				
AV	4.96G	42.32	54.00	-11.68	4.49	3	Horizontal	340	1.02	-				
PK	4.96G	49.37	74.00	-24.63	4.49	3	Horizontal	340	1.02	-				