

Report No.: SEWM2306000190RG04

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### **TEST REPORT**

**Application No:** SEWM2306000190RG

Applicant: NetComm Wireless Pty Ltd

**Address of Applicant:** Level 5, 18-20 Orion Road, Lane Cove, NSW, Australia

Manufacturer: Casa Systems, Inc.

Address of Manufacturer: 100 Old River Road Andover, MA 01810

**EUT Description:** 5G Wi-Fi 6 Residential Gateway

Model No.: CFW-4222

Trade Mark:

casa systems

FCC ID: XIA-CFW4222A

Standards: FCC 47 CFR Part 2, Subpart J

FCC 47 CFR Part 15, Subpart C

Date of Receipt: 2022/11/01

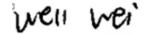
**Date of Test:** 2022/11/21 to 2022/12/15 (for original report SEWM2210000221RG04)

Date of Issue: 2023/06/25

PASS \* Test Result:

In the configuration tested, the EUT detailed in this report complied with the standards specified above.

Authorized Signature:



Well Wei Wireless Laboratory Manager



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### 1 Version

Revision Record					
Version Chapter Date Modifier Remark					
01		2023/06/25		Original	

Prepared By	(Ives Cheng) / Test Engineer
Checked By	Stone Gu) / Reviewer



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2 Test Summary

Test Item	FCC Rule No.	Test Method	Test Result	Result
Antenna Requirement	15.203/15.247(b)		Clause 4.1	PASS
AC Power Line Conducted Emission 15.207		ANSI C63.10 2013 Section 6.2	Clause 4.2	PASS
Conducted Output Power	15.247 (b)(3)	ANSI C63.10 2013 Section11.9.2.3	Clause 4.4	PASS
DTS (6 dB) Bandwidth & 99% Occupied Bandwidth	15.247 (a)(2)	ANSI C63.10 2013 Section 11.8 Option 2 / 6.9.3	Clause 4.5	PASS
Power Spectral Density	15.247 (e)	ANSI C63.10 2013 Section 11.10.2	Clause 4.6	PASS
Band-edge for RF Conducted Emissions	15.247(d)	ANSI C63.10 2013 Section 11.11	Clause 4.7	PASS
RF Conducted Spurious Emissions	15.247(d)	ANSI C63.10 2013 Section 11.11	Clause 4.8	PASS
Radiated Spurious Emissions	15.205/15.209	ANSI C63.10 2013 Section 11.12	Clause 4.9	PASS
Restricted bands around fundamental frequency (Radiated Emission)	15.205/15.209	ANSI C63.10 2013 Section 11.12	Clause 4.10	PASS



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#### Remark:

This test report (Report No.: SEWM2306000190RG04 issue on 2023/06/25) is based on the original test report (Report No.: SEWM2210000221RG04 issue on 2022/12/15).

Review this report and original report, this report just changing the parts according to the declaration letter

Therefore in this report all items do not need to retest and all test data in this report are based on the previous report with report number SEWM2210000221RG04 issue on 2022/12/15.





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### 3 General Information

#### 3.1 Details of Client

Applicant:	NetComm Wireless Pty Ltd
Address of Applicant:	Level 5, 18-20 Orion Road, Lane Cove, NSW, Australia
Manufacturer:	Casa Systems, Inc.
Address of Manufacturer:	100 Old River Road Andover, MA 01810

#### 3.2 Test Location

Company:	SGS-CSTC Standards Technical Services (Suzhou) Co., Ltd.
Address:	South of No. 6 Plant, No. 1, Runsheng Road, Suzhou Industrial Park, Suzhou Area, China (Jiangsu) Pilot Free Trade Zone
Post code:	215000
Test engineer:	Ives Cheng, Tizzy Song

### 3.3 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

#### • A2LA (Certificate No. 6336.01)

SGS-CSTC STANDARDS TECHNICAL SERVICES (SUZHOU) CO., LTD. is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 6336.01.

#### • Innovation, Science and Economic Development Canada

SGS-CSTC STANDARDS TECHNICAL SERVICES (SUZHOU) CO., LTD. has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0120.

IC#: 27594.

#### FCC –Designation Number: CN1312

SGS-CSTC STANDARDS TECHNICAL SERVICES (SUZHOU) CO., LTD. has been recognized as an

accredited testing laboratory.

Designation Number: CN1312.

Test Firm Registration Number: 717327



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### 3.4 General Description of EUT

EUT Description:	5G Wi-Fi 6 Residential (	Gateway		
Model No.:	CFW-4222			
Trade Mark:	casa systems			
Hardware Version:	V1.1			
Software Version:	CFW4222-CS.NA			
IN AIT I.	RF Conducted	863109050014732		
IMEI:	RSE & AC power line	863109050015952		
Operation Frequency:	fc = 2402 MHz + N * 2 M -fc = "Operating Frequer	2400MHz~2483.5MHz fc = 2402 MHz + N * 2 MHz, where: -fc = "Operating Frequency" in MHz, -N = "Channel Number" with the range from 0 to 39.		
Bluetooth version:	Bluetooth V5.1			
Modulation Type:	GFSK	GFSK		
Number of Channel:	40			
Rates Type*:	☑Provided by client 1M PHY 2M PHY			
Antenna Type:	PCB Antenna			
	4.08dBi (Ant1)			
Antenna Gain:	Note: The antenna gain are derived from the gain information report provided by the manufacturer.			
RF Cable:	1.0dB			

Note: \*Since the above data and/or information is provided by the client relevant results or conclusions of this report are only made for these data and/or information , SGS is not responsible for the authenticity, integrity and results of the data and information and/or the validity of the conclusion.

Remark:

As above information is provided and confirmed by the applicant. SGS is not liable to the accuracy, suitability, reliability or/and integrity of the information.

#### Accessory:

Description	Manufacturer	Model No.	Power Rating
Adapter	Shenzhen Keyu Power Supply Technology Co., Ltd.	KA36B-1203000US	Input:100- 240V~, 50/60Hz, 1.0A Max, Output:12VDC, 3000 mA



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Operation Frequency of each channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
0	2402MHz	10	2422MHz	20	2442MHz	30	2462MHz
1	2404MHz	11	2424MHz	21	2444MHz	31	2464MHz
2	2406MHz	12	2426MHz	22	2446MHz	32	2466MHz
3	2408MHz	13	2428MHz	23	2448MHz	33	2468MHz
4	2410MHz	14	2430MHz	24	2450MHz	34	2470MHz
5	2412MHz	15	2432MHz	25	2452MHz	35	2472MHz
6	2414MHz	16	2434MHz	26	2454MHz	36	2474MHz
7	2416MHz	17	2436MHz	27	2456MHz	37	2476MHz
8	2418MHz	18	2438MHz	28	2458MHz	38	2478MHz
9	2420MHz	19	2440MHz	29	2460MHz	39	2480MHz

#### Remark:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Channel	Frequency
The Lowest channel(CH0)	2402MHz
The Middle channel(CH19)	2440MHz
The Highest channel(CH39)	2480MHz



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### 3.5 Test Environment

Normal Temperature

Environment Parameter	101.0 kPa Selected Values During Tests				
Relative Humidity	44-46 % RH Ambient				
Value	Temperature(°C) Voltage(V)				
NTNV	22~23 12				
Remark: NV: Normal Voltage					

### 3.6 Description of Support Units

The EUT has been tested as an independent unit.



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### 4 Test results and Measurement Data

### 4.1 Antenna Requirement

Standard requirement: 47 CFR Part 15C Section 15.203 /247(b)

15.203 requirement:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

15.247(b) (4) requirement:

The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

The antenna is PCB Antenna and no consideration of replacement.

The best case gain of the antenna is 4.08dBi(Ant1). \*

\*Note:

The antenna gain are derived from the gain information report provided by the manufacturer. Remark:

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### 4.2 AC Power Line Conducted Emissions

Test Requirement:	47 CFR Part 15C Section 15.207			
Test Method:	ANSI C63.10: 2013 Section 6.2			
Test Frequency Range:	150kHz to 30MHz			
Receiver Setup:	RBW = 9kHz, VBW = 30kHz			
Limit:	Limit (dBuV)			
	Frequency range(MHz)	Quasi-peak	Average	
	0.15-0.5	66 to 56*	56 to 46*	
	0.5-5	56	46	
	5-30	60	50	
	* Decreases with the log	arithm of the frequency.		
Test Procedure:	The mains terminal discrete room.	sturbance voltage test was co	onducted in a shielded	
	,		a 50Ω/50µH + 5Ω linear the EUT were I to the ground reference eing measured. A ultiple power cables to a ot exceeded. table 0.8m above the angement, the EUT was rence plane. The rear of ference plane. The horizontal ground m the boundary of the plane for LISNs is distance was between other units of the EUT in the LISN 2.	



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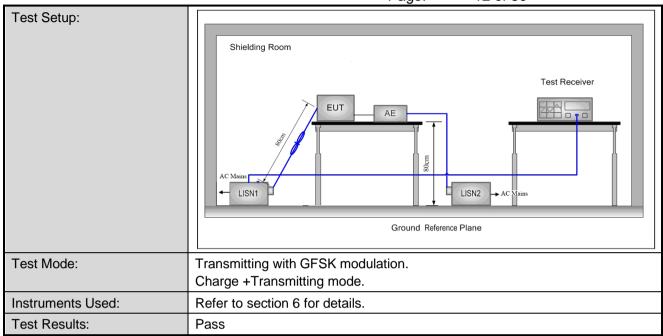
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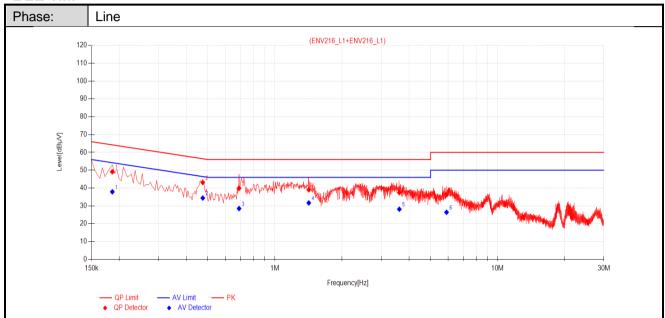
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#### Measurement Data

An initial pre-scan was performed on the live and neutral lines with peak detector.

Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.

### BLE 1M:



Data	Data List												
NO.	Frequency [MHz]	Factor [dB]	QP Reading [dBµV]	QP Value [dBµV]	QP Limit [dBµV]	QP Margin [dB]	AV Reading [dBµV]	AV Value [dBµV]	AV Limit [dBµV]	AV Margin [dB]	Verdict		
1	0.1860	10.77	38.36	49.13	64.21	15.08	27.13	37.90	54.21	16.31	PASS		
2	0.4740	10.59	32.52	43.11	56.44	13.33	23.82	34.41	46.44	12.03	PASS		
3	0.6900	10.57	29.31	39.88	56.00	16.12	17.95	28.52	46.00	17.48	PASS		
4	1.4190	10.79	28.24	39.03	56.00	16.97	20.88	31.67	46.00	14.33	PASS		
5	3.6195	10.71	26.74	37.45	56.00	18.55	17.43	28.14	46.00	17.86	PASS		
6	5.8965	10.66	25.54	36.20	60.00	23.80	15.75	26.41	50.00	23.59	PASS		

#### Remark:

- 1. The following Quasi-Peak and Average measurements were performed on the EUT:
- 2. Value =Reading[dBµV] + Factor(Lisn factor[dB] + cable loss[dB]).
- 3. Margin = Limit[ $dB\mu V$ ] Value[ $dB\mu V$ ]



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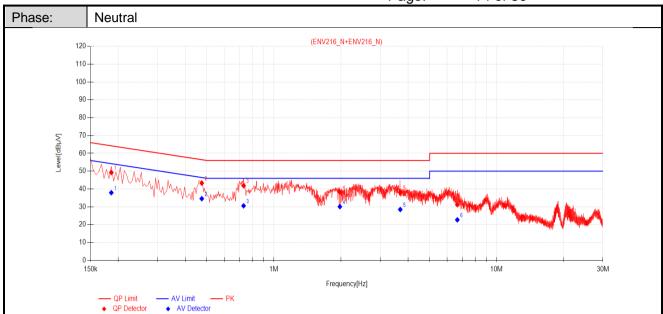
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Data	List										
NO.	Frequency [MHz]	Factor [dB]	QP Reading [dBµV]	QP Value [dBµV]	QP Limit [dBµV]	QP Margin [dB]	AV Reading [dBµV]	AV Value [dBµV]	AV Limit [dBµV]	AV Margin [dB]	Verdict
1	0.1860	10.68	38.58	49.26	64.21	14.95	27.25	37.93	54.21	16.28	PASS
2	0.4740	10.81	32.50	43.31	56.44	13.13	23.77	34.58	46.44	11.86	PASS
3	0.7305	10.81	31.06	41.87	56.00	14.13	19.77	30.58	46.00	15.42	PASS
4	1.9770	10.77	27.60	38.37	56.00	17.63	19.30	30.07	46.00	15.93	PASS
5	3.6915	10.70	27.33	38.03	56.00	17.97	17.81	28.51	46.00	17.49	PASS
6	6.6615	10.54	20.65	31.19	60.00	28.81	12.17	22.71	50.00	27.29	PASS

#### Remark:

- 1. The following Quasi-Peak and Average measurements were performed on the EUT:
- 2. Value = Reading[dB $\mu$ V] + Factor(Lisn factor[dB] + cable loss[dB]).
- 3. Margin = Limit[ $dB\mu V$ ] Value[ $dB\mu V$ ]



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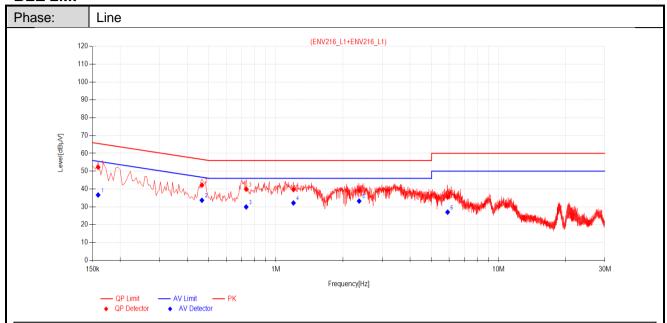
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#### BLE 2M:



Data	List										
NO.	Frequency [MHz]	Factor [dB]	QP Reading [dBµV]	QP Value [dBµV]	QP Limit [dBµV]	QP Margin [dB]	AV Reading [dBµV]	AV Value [dBµV]	AV Limit [dBµV]	AV Margin [dB]	Verdict
1	0.1590	10.67	41.54	52.21	65.52	13.31	25.98	36.65	55.52	18.87	PASS
2	0.4650	10.57	31.62	42.19	56.60	14.41	23.10	33.67	46.60	12.93	PASS
3	0.7350	10.55	29.37	39.92	56.00	16.08	19.39	29.94	46.00	16.06	PASS
4	1.1985	10.78	28.90	39.68	56.00	16.32	21.39	32.17	46.00	13.83	PASS
5	2.3640	10.66	28.49	39.15	56.00	16.85	22.58	33.24	46.00	12.76	PASS
6	5.9010	10.66	24.75	35.41	60.00	24.59	16.37	27.03	50.00	22.97	PASS

#### Remark:

- 1. The following Quasi-Peak and Average measurements were performed on the EUT:
- 2. Value =Reading[dBµV] + Factor(Lisn factor[dB] + cable loss[dB]).
- 3. Margin = Limit[ $dB\mu V$ ] Value[ $dB\mu V$ ]



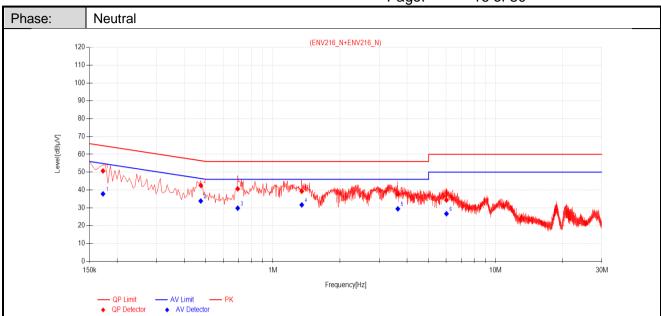
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Data	List										
NO.	Frequency [MHz]	Factor [dB]	QP Reading [dBµV]	QP Value [dBµV]	QP Limit [dBµV]	QP Margin [dB]	AV Reading [dBµV]	AV Value [dBµV]	AV Limit [dBµV]	AV Margin [dB]	Verdict
1	0.1725	10.71	39.99	50.70	64.84	14.14	27.12	37.83	54.84	17.01	PASS
2	0.4740	10.81	31.83	42.64	56.44	13.80	23.02	33.83	46.44	12.61	PASS
3	0.6945	10.80	29.85	40.65	56.00	15.35	19.01	29.81	46.00	16.19	PASS
4	1.3470	10.78	28.53	39.31	56.00	16.69	20.87	31.65	46.00	14.35	PASS
5	3.6375	10.69	27.08	37.77	56.00	18.23	18.74	29.43	46.00	16.57	PASS
6	6.0135	10.58	23.80	34.38	60.00	25.62	16.11	26.69	50.00	23.31	PASS

#### Remark:

- 1. The following Quasi-Peak and Average measurements were performed on the EUT:
- 2. Value = Reading[dB $\mu$ V] + Factor(Lisn factor[dB] + cable loss[dB]).
- 3. Margin = Limit[ $dB\mu V$ ] Value[ $dB\mu V$ ]



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### 4.3 Duty Cycle

The detailed test data see: Appendix



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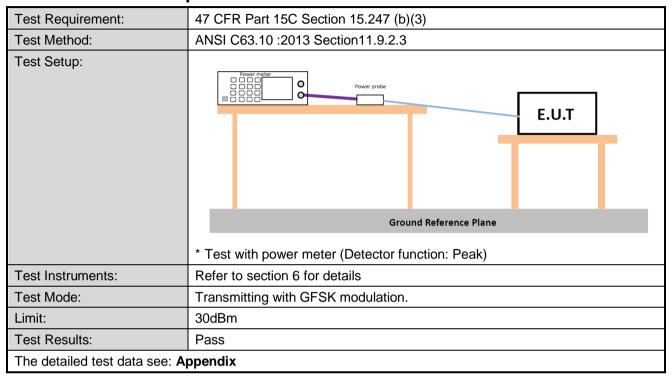
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### 4.4 Conducted Output Power





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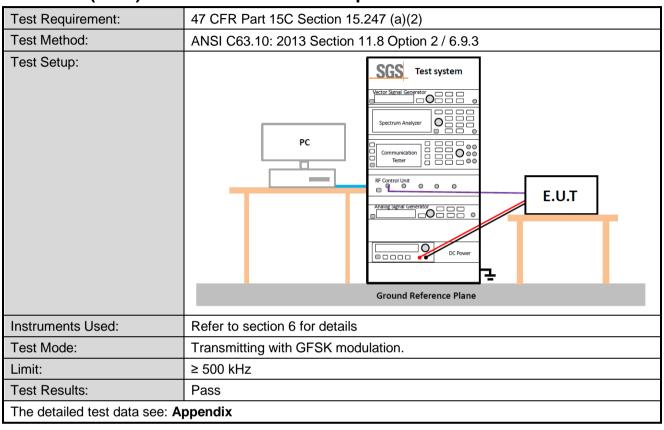
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### 4.5 DTS (6 dB) Bandwidth & 99% Occupied Bandwidth





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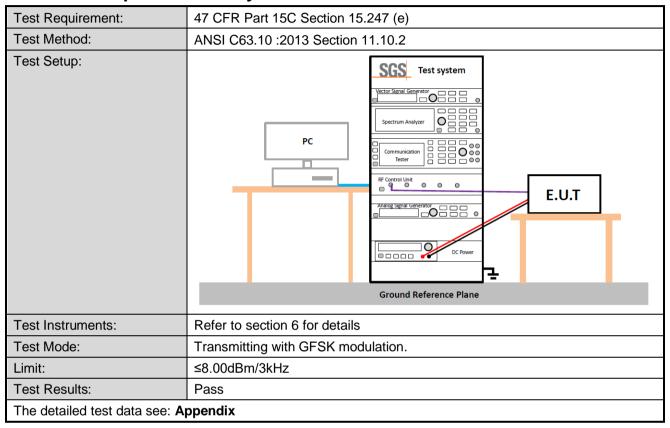
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### 4.6 Power Spectral Density





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### 4.7 Band-edge for RF Conducted Emissions

Test Requirement:	47 CFR Part 15C Section 15.247 (d)					
Test Method:	ANSI C63.10: 2013 Section 11.11					
Test Setup:	PC    Spectrum Analyzer   O   O   O   O   O   O   O   O   O					
Instruments Used:	Refer to section 6 for details					
Test Mode:	Transmitting with GFSK modulation.					
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.					
Test Results:	Pass					
The detailed test data see: A	ppendix					



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### 4.8 RF Conducted Spurious Emissions

Test Requirement:	47 CFR Part 15C Section 15.247 (d)				
Test Method:	ANSI C63.10: 2013 Section 11.11				
Test Setup:	PC   Communication   O O O O O O O O O O O O O O O O O O				
Instruments Used:	Refer to section 6 for details				
Test Mode:	Transmitting with GFSK modulation.				
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.				
Test Results:	Pass				
The detailed test data see: A	ppendix				



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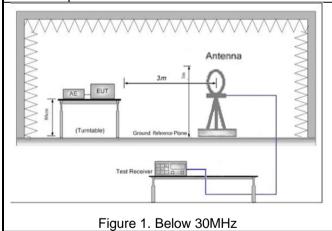
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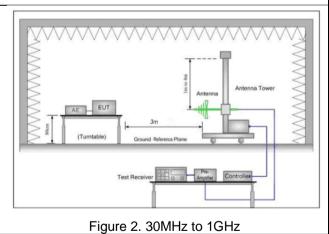
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### 4.9 Radiated Spurious Emissions

Test Requirement:	47 CFR Part 15C Section 15.209 and 15.205						
Test Method:	ANSI C63.10 :2013 Sec	tion 11.12					
Test Site:	Measurement Distance:	3m (Semi-Anecho	ic Chamber)				
Test Frequency:	9kHz ~ 25GHz						
Limit:	Frequency	Field strength (microvolt/meter)	Limit (dBuV/m)	Remark	Measurement distance (m)		
	0.009MHz-0.490MHz	2400/F(kHz)	-	-	300		
	0.490MHz-1.705MHz 24000/F(kHz) 30						
	1.705MHz-30MHz 30 30						
	30MHz-88MHz	100	40.0	Quasi-peak	3		
	88MHz-216MHz	150	43.5	Quasi-peak	3		
	216MHz-960MHz	200	46.0	Quasi-peak	3		
	960MHz-1GHz	500	54.0	Quasi-peak	3		
	Above 1GHz	500	54.0	Average	3		
	Remark: 15.35(b),Unles emissions is 20dB above applicable to the equipm emission level radiated by	e the maximum pe nent under test. Thi	rmitted avera	age emission li	mit		

#### Test Setup:







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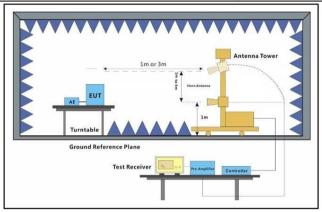


Figure 3. Above 1 GHz

#### Test Procedure:

- For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.
- For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation (Distance from antenna to EUT is 1m for measurements >18GHz).
- The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters(for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- Test the EUT in the lowest channel, the middle channel, the Highest channel.
- The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, And found the X axis positioning which it is worse case.
- Repeat above procedures until all frequencies measured was complete.
- The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported
- The disturbance above 18GHz was very low, and the harmonics were the highest point could be found when testing, so only the harmonics had been displayed.
- At a measurement distance of 1 meter the limit line was increased by 20\*LOG(3/1) = 9.54 dB.

#### **Test Configuration:**

Measurements Below 1000MHz

- RBW = 120 kHz
- VBW = 300 kHz
- Detector = Peak
- Trace mode = max hold



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	9
	Peak Measurements Above 1000 MHz
	• RBW = 1 MHz
	• VBW ≥ 3 MHz
	Detector = Peak
	Sweep time = auto
	Trace mode = max hold
	Average Measurements Above 1000MHz
	• RBW = 1 MHz
	• VBW ≥ [3 *RBW]
	<ul> <li>Detector = RMS (power averaging), if span / (# of points in sweep) ≤ (RBW / 2).</li> <li>Satisfying this condition may require increasing the number of points in the sweep or reducing the span. If this condition cannot be satisfied, then the detector mode shall be set to peak.</li> <li>Sweep time = auto</li> </ul>
	·
	Perform a trace average of at least 100 traces.
Exploratory Test Mode:	Transmitting with GFSK modulation.
Mode:	Charge + Transmitting mode.
Final Test Mode:	Transmitting with GFSK modulation.
	Pretest the EUT at Charge + Transmitting mode,
	For below 1GHz part, through pre-scan, the worst case is the lowest channel. Only the worst case is recorded in the report.
Instruments Used:	Refer to section 6 for details
Test Results:	Pass
The detailed test data	see: Appendix



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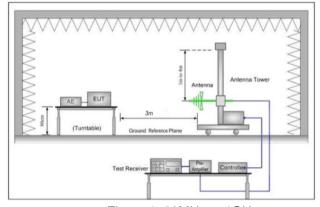
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### 4.10 Restricted bands around fundamental frequency

Test Requirement:	47 CFR Part 15C Section 15	47 CFR Part 15C Section 15.209 and 15.205							
Test Method:	ANSI C63.10: 2013 Section	ANSI C63.10: 2013 Section 11.12							
Test Site:	Measurement Distance: 3m	(Semi-Anechoic Cham	ber)						
Limit:	Frequency	Limit (dBuV/m)	Remark						
	30MHz-88MHz	40.0	Quasi-peak						
	88MHz-216MHz	43.5	Quasi-peak						
	216MHz-960MHz	46.0	Quasi-peak						
	960MHz-1GHz	54.0	Quasi-peak						
	Above 4CH=	54.0	Average Value						
	Above 1GHz	74.0	Peak Value						

#### Test Setup:



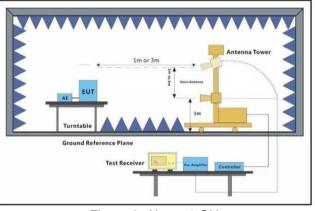


Figure 1. 30MHz to 1GHz

Figure 2. Above 1 GHz

#### Test Procedure:

- a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- d. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- g. Place a marker at the end of the restricted band closest to the transmit



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	frequency to show compliance. Also measure any emissions in the restricted bands. Save the spectrum analyzer plot. Repeat for each power and modulation for lowest and highest channel  h. Test the EUT in the lowest channel, the Highest channel  i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, And found the X axis positioning which it is worse case.  j. Repeat above procedures until all frequencies measured was complete.
Test Configuration:	<ul> <li>RBW = 120 kHz</li> <li>VBW = 300 kHz</li> <li>Detector = Peak</li> <li>Trace mode = max hold</li> <li>Peak Measurements Above 1000 MHz</li> <li>RBW = 1 MHz</li> <li>VBW ≥ 3 MHz</li> <li>Detector = Peak</li> <li>Sweep time = auto</li> <li>Trace mode = max hold</li> <li>Average Measurements Above 1000MHz</li> <li>RBW = 1 MHz</li> <li>VBW ≥ [3 *RBW]</li> <li>Detector = RMS (power averaging), if span / (# of points in sweep) ≤ (RBW / 2). Satisfying this condition may require increasing the number of points in the sweep or reducing the span. If this condition cannot be satisfied, then the detector mode shall be set to peak.</li> <li>Sweep time = auto</li> <li>Perform a trace average of at least 100 traces.</li> </ul>
Exploratory Test Mode:	Transmitting with GFSK modulation. Charge + Transmitting mode.
Final Test Mode:	Transmitting with GFSK modulation.  Pretest the EUT at Charge + Transmitting mode.  Only the worst case is recorded in the report.
Instruments Used:	Refer to section 6 for details
Test Results:	Pass
The detailed test data see	e: Appendix



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### 5 Measurement Uncertainty (95% confidence levels, k=2)

	mode and more discontainty (50% commediate to total, K-2)						
No.	Item	Measurement Uncertainty					
1	Total RF power, conducted	±0.54dB					
2	RF power density, conducted	±1.03dB					
3	Spurious emissions, conducted	±0.54dB					
4	Radio Frequency	±1.0 %					
5	Duty Cycle	±0.37%					
6	Occupied Bandwidth	±1.0 %					
7	Conduction Emission	± 2.90dB (150kHz to 30MHz)					
		± 3.13dB (9k -30MHz)					
0	Dedicted Emission	± 4.80dB (30M -1GHz)					
8	Radiated Emission	± 4.80dB (1GHz to 18GHz)					
		± 4.80dB (Above 18GHz)					

#### Remark:

The U<sub>lab</sub> (lab Uncertainty) is less than U<sub>cispr/ETSI</sub> (CISPR/ETSI Uncertainty), so the test results

- compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;

- non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.



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6 Equipment List

	RF Test Equipment									
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date (yyyy/mm/dd)	Cal Due Date (yyyy/mm/dd)					
Shielding Room	Brilliant-emc	N/A	SUWI-04-01-06	2021/05/08	2024/05/07					
Temperature and humidity meter	MingGao	TH101B	SUWI-01-01-07	2022/02/16	2023/02/15					
Signal Analyzer	ROHDE &SCHWARZ	FSV3030	SUWI-01-02-02	2022/05/17	2023/05/16					
Measurement Software	Tonscend	JS1120-3 Test System V3.1.55	SUWI-02-09-09	NCR	NCR					
DC Power Supply	HYELEC	HY3005B	SUWI-01-18-01	2022/02/15	2023/02/14					
Signal Analyzer	ROHDE &SCHWARZ	FSW43	SUWI-01-02-04	2022/05/28	2023/05/27					
Power meter	Anritsu	ML2495A	SUWI-01-31-01	2021/12/04	2022/12/03					
Power meter	Annisu	WLZ495A	30771-01-31-01	2022/11/23	2023/11/22					
Pulse power	Anritsu	MA2411B	SUWI-01-32-01	2021/12/04	2022/12/03					
sensor	Annisu	WAZ411D	30771-01-32-01	2022/11/23	2023/11/22					
MXG Vector signal genitor	KEYSIGHT	N5182B	SUWI-01-38-01	2022/02/14	2023/02/13					
Temperature Chamber	ESPEC	SU-242	SUWI-01-13-01	2022/02/15	2023/02/14					
Wideband Radio Communication Tester	ROHDE &SCHWARZ	CMW500	SUWI-01-16-05	2022/02/14	2023/02/13					

CE Test System								
Equipment	Manufacturer	Model No.	Inventory No. Cal Date (yyyy/mm/dd)		Cal Due Date (yyyy/mm/dd)			
Shielding Room	Brilliant-emc	N/A	SUWI-04-03-01	2021/05/08	2024/05/07			
Artificial network	ROHDE&SCHWARZ	ENV216	SUWI-01-19-01	2022/02/19	2023/02/18			
Artificial network	ROHDE&SCHWARZ	ENV216	SUWI-01-19-02	2022/02/19	2023/02/18			
Measurement Software	Tonscend	JS32-CE V4.0.0.2	SUWI-02-09-05	NCR	NCR			
Test receiver	ROHDE&SCHWARZ	ESR7	SUWI-01-10-01	2022/02/19	2023/02/18			
Temperature and humidity meter	MingGao	TH101B	SUWI-01-01-06	2022/02/16	2023/02/15			



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RSE Test System								
Test Equipment	Manufacturer	Manufacturer Model No. Inventory N		Cal. date (yyyy/mm/dd)	Cal.Due date (yyyy/mm/dd)			
Semi-Anechoic Chamber	Brilliant-emc	N/A	SUWI-04-02-02	2021/11/25	2024/11/24			
Temperature and humidity meter	MingGao	TH101B	SUWI-01-01-15	2022/02/16	2023/02/15			
Signal Analyzer	ROHDE&SCHWARZ	FSW43	SUWI-01-02-04	2022/05/28	2023/05/27			
Cional Analyzar	KEYSIGHT	N9020A	SUWI-01-02-06	2021/12/04	2022/12/03			
Signal Analyzer				2022/11/23	2023/11/22			
Test receiver	ROHDE&SCHWARZ	ESR7	SUWI-01-10-01	2022/02/19	2023/02/18			
DC Power Supply	HYELEC	HY3005B	SUWI-01-18-01	2022/02/15	2023/02/14			
Receiving antenna	SCHWRZBECK MESS- ELEKTRONIK	VULB 9163	SUWI-01-11-04	2021/12/05	2023/12/04			
Receiving antenna	SCHWRZBECK MESS- ELEKTRONIK	BBHA 9120D	SUWI-01-11-05	2021/12/05	2023/12/04			
Receiving antenna	SCHWRZBECK MESS- ELEKTRONIK	BBHA 9170	SUWI-01-11-03	2021/05/14	2023/05/13			
Active Loop Antenna	SCHWRZBECK MESS- ELEKTRONIK	FMZB 1519B	SUWI-01-21-01	2021/06/10	2023/06/09			
Amplifion	Tonscend	TAP9K3G32	SUWI-01-14-06	2021/12/04	2022/12/03			
Amplifier				2022/11/23	2023/11/22			
Amplifier	Tonscend	TAP01018050	SUWI-01-14-04	2021/12/04	2022/12/03			
				2022/11/23	2023/11/22			
Amplifier	Tonscend	TAP30M7G30	SUWI-01-14-05	2021/12/04	2022/12/03			
				2022/11/23	2023/11/22			
Measurement Software	Tonscend	JS32-RE V4.0.0.0	SUWI-02-09-04	NCR	NCR			



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### 7 Photographs - Setup Photos

Refer to Appendix A.2 WLAN Setup Photos.



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# **Appendix**



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### DTS Bandwidth Test Result

TestMode	Antenna	Frequency[MHz]	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	0.71	2401.64	2402.35	≥0.5	PASS
		2440	0.70	2439.65	2440.35	≥0.5	PASS
		2480	0.70	2479.65	2480.35	≥0.5	PASS
BLE_2M	Ant1	2402	1.19	2401.40	2402.59	≥0.5	PASS
		2440	1.18	2439.41	2440.59	≥0.5	PASS
		2480	1.18	2479.41	2480.59	≥0.5	PASS



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### **Test Graphs**





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# Occupied Channel Bandwidth Test Result

TestMode	Antenna	Frequency[MHz]	OCB [MHz]	FL[MHz]	FH[MHz]	Verdict
		2402	1.032	2401.493	2402.524	
BLE_1M	Ant1	2440	1.023	2439.492	2440.515	
		2480	1.018	2479.494	2480.513	For Report
		2402	2.029	2400.997	2403.026	Purpose
BLE_2M	Ant1	2440	2.029	2438.995	2441.024	
		2480	2.026	2478.995	2481.021	



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#### **Test Graphs**





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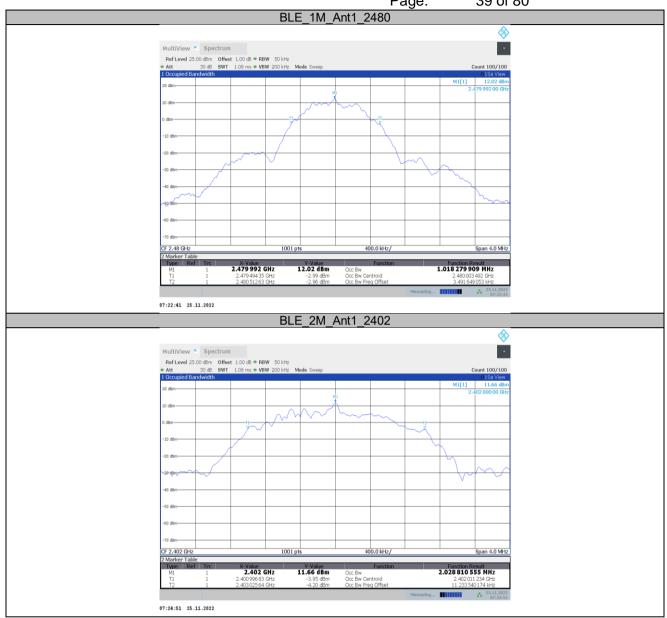
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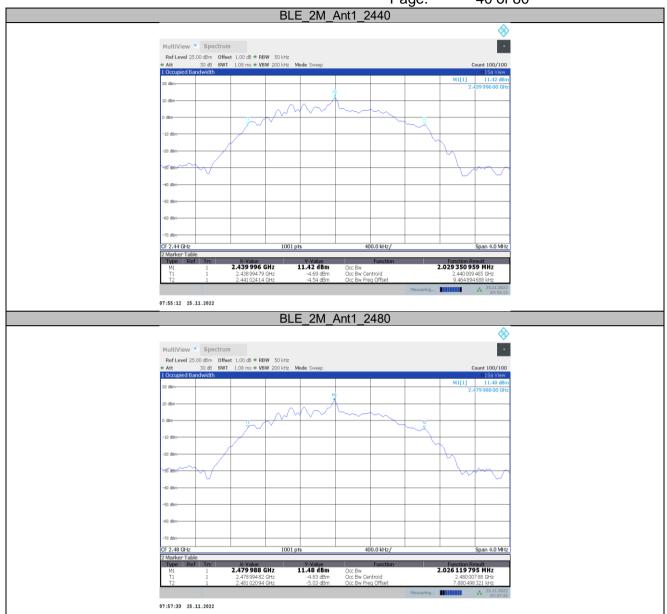
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#### Maximum conducted output power Test Result Peak

TestMode	Antenna	Frequency[MHz]	Conducted Peak Power[dBm]	Conducted Limit[dBm]	Verdict
		2402	13.82	≤30	PASS
BLE_1M	Ant1	2440	13.52	≤30	PASS
		2480	13.62	≤30	PASS
		2402	13.68	≤30	PASS
BLE_2M	Ant1	2440	13.69	≤30	PASS
		2480	13.66	≤30	PASS



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#### Maximum power spectral density Test Result

TestMode	Antenna	Frequency[MHz]	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
		2402	-1.39	≤8.00	PASS
BLE_1M	Ant1	2440	-1.42	≤8.00	PASS
		2480	-1.51	≤8.00	PASS
		2402	-4.18	≤8.00	PASS
BLE_2M	Ant1	2440	-4.3	≤8.00	PASS
		2480	-4.11	≤8.00	PASS



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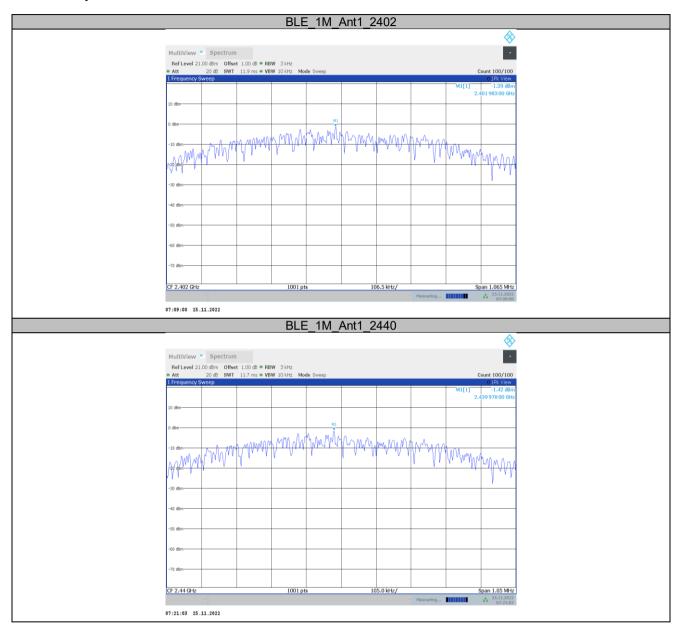
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#### **Test Graphs**





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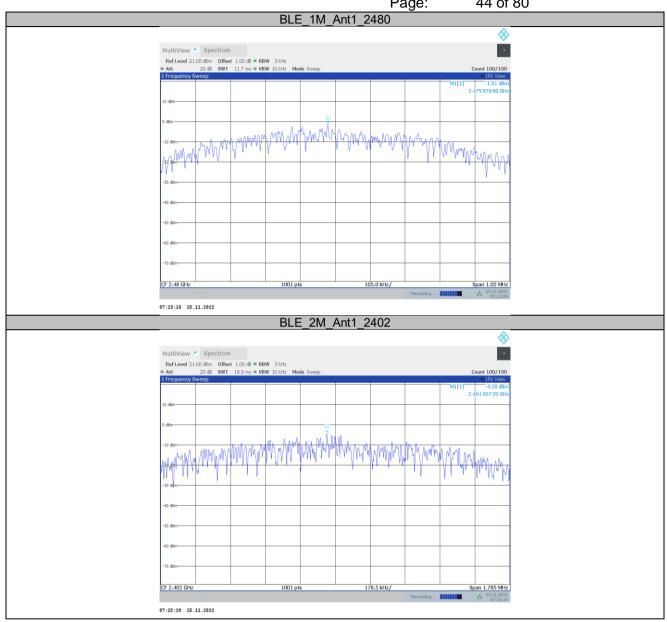
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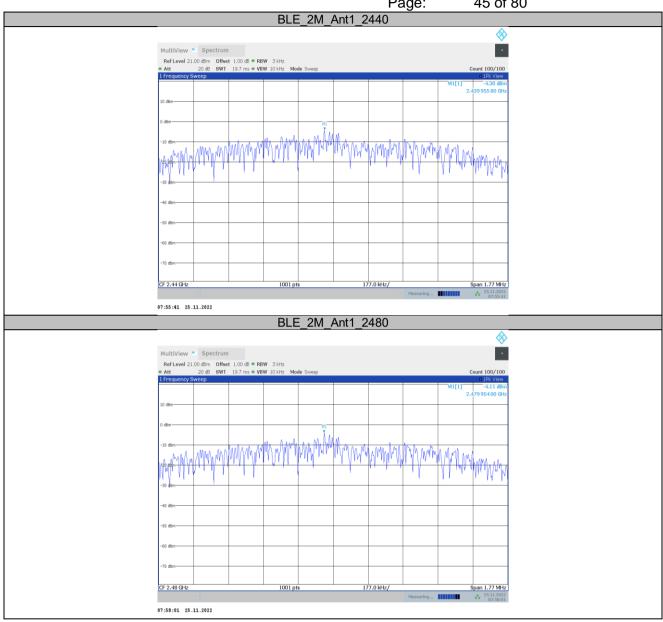
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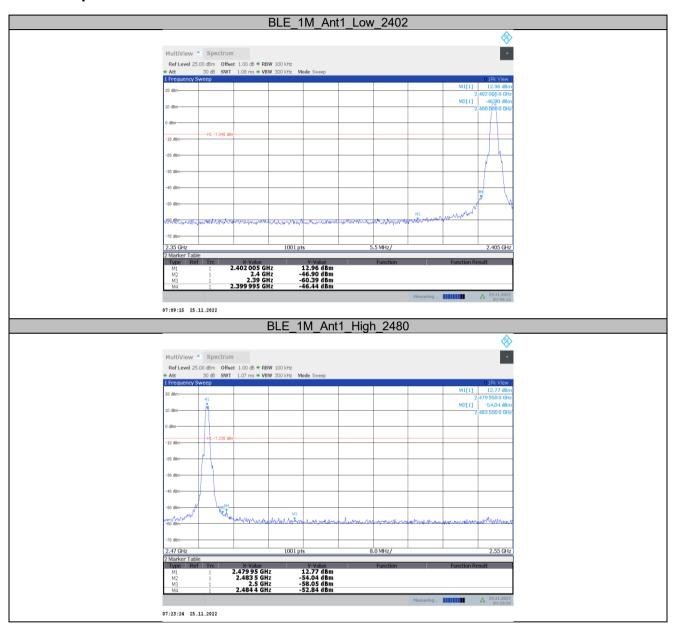


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#### Band edge measurements Test Graphs





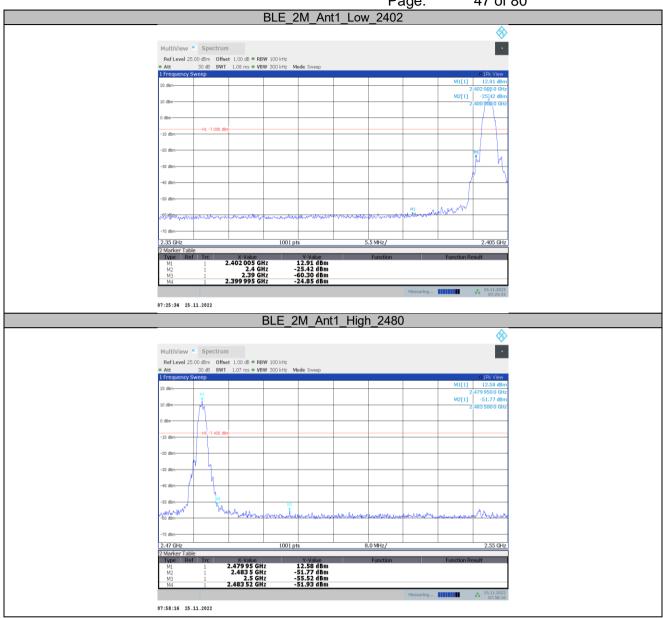
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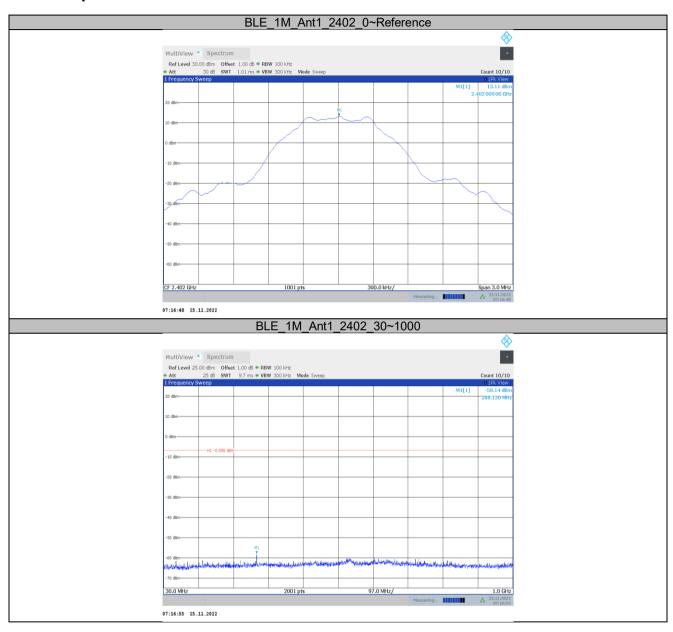


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# **Conducted Spurious Emission Test Graphs**





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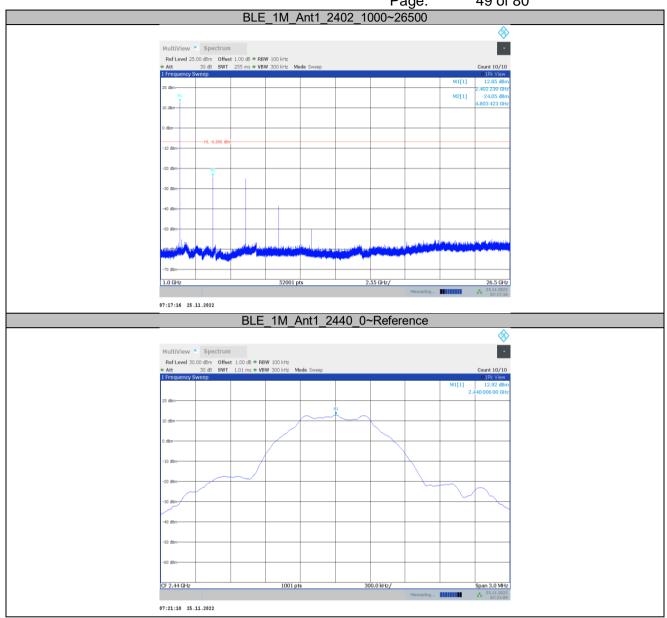
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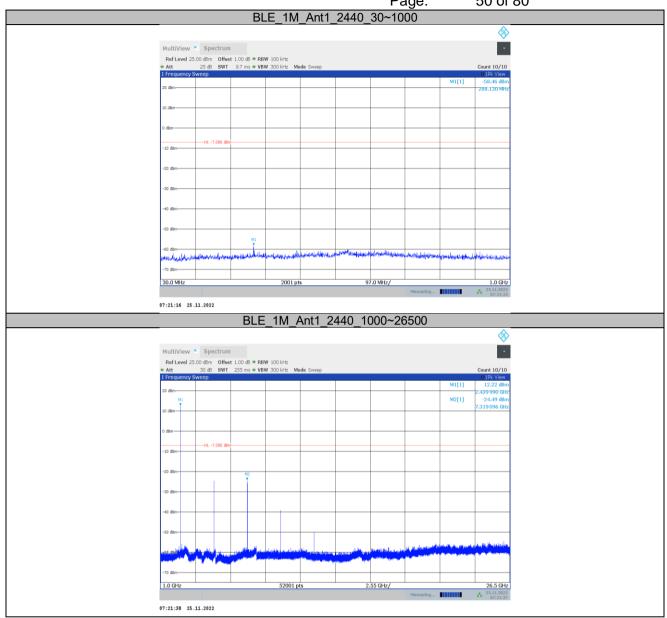
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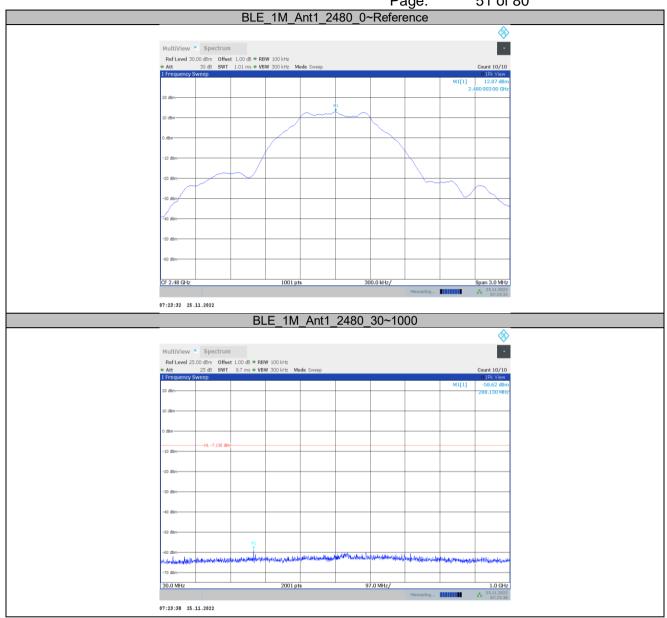
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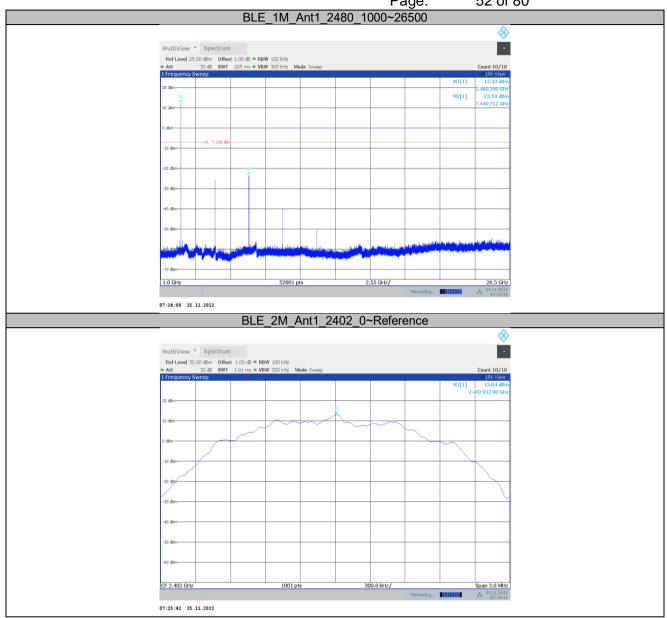
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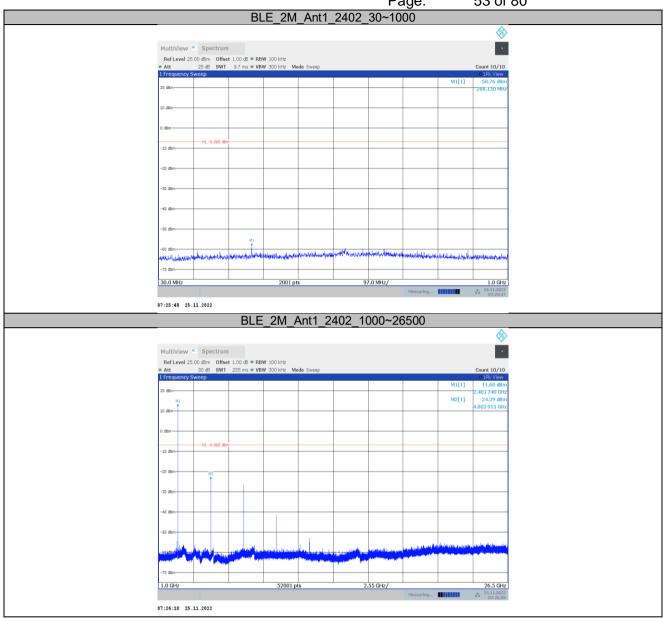
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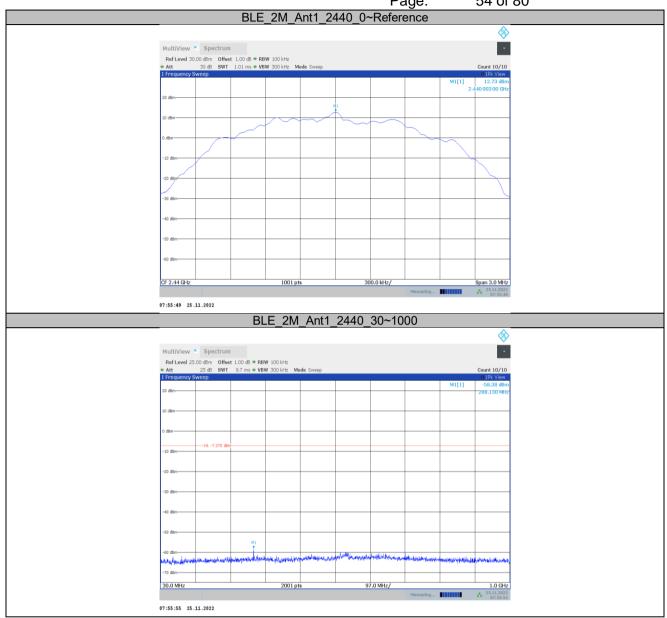
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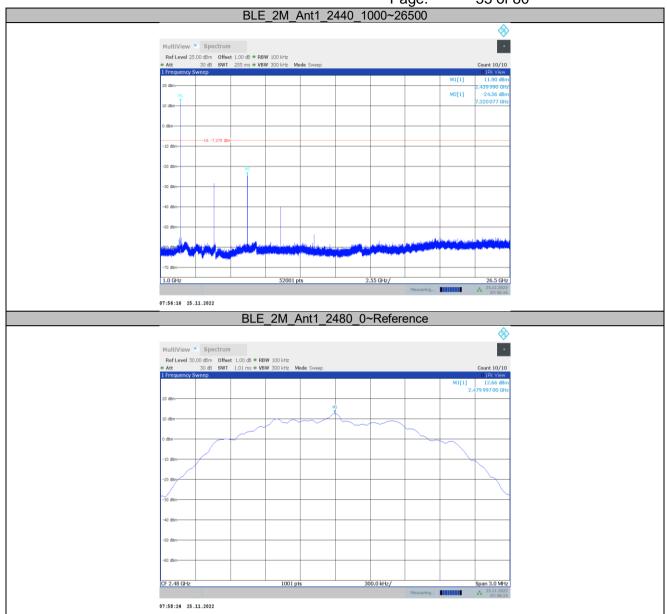
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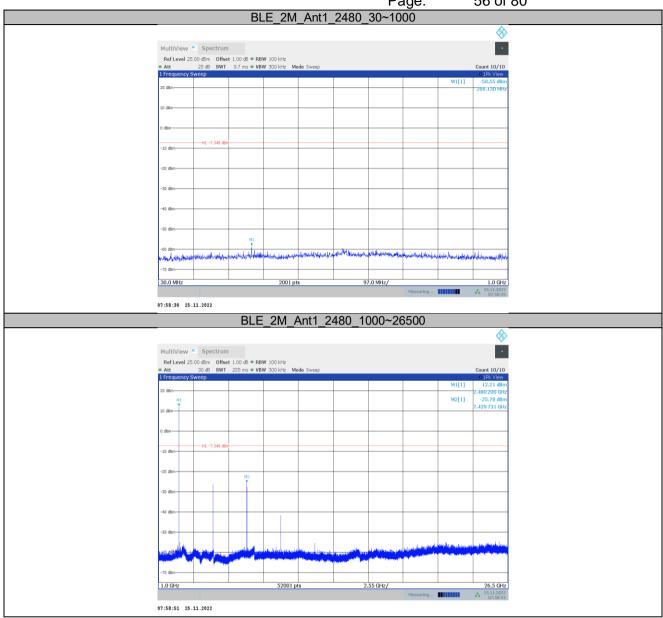
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#### **Duty Cycle** Test Result

TestMode	Antenna	Frequency[MHz]	ON Time [ms]	Period [ms]	Duty Cycle [%]	Duty Cycle Factor[dB]
BLE_1M	Ant1	2402	0.39	0.63	61.90	2.08
BLE 2M	Ant1	2402	0.20	0.62	32.26	4.91



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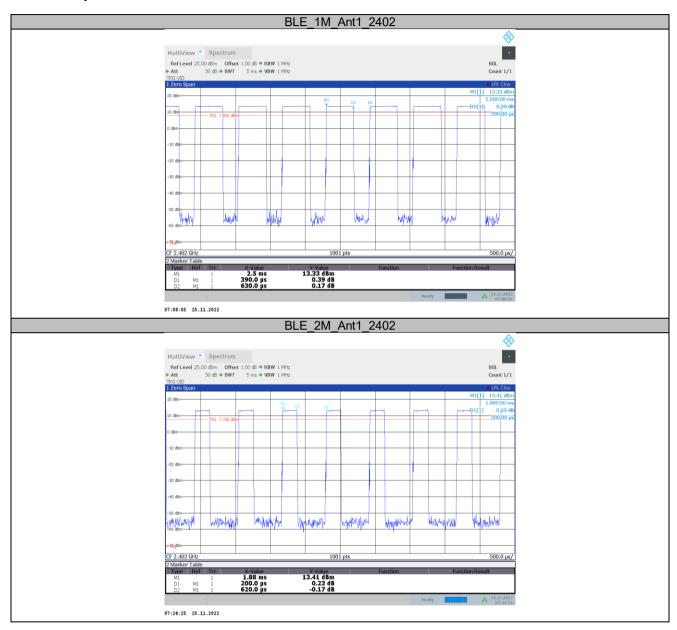


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#### **Test Graphs**





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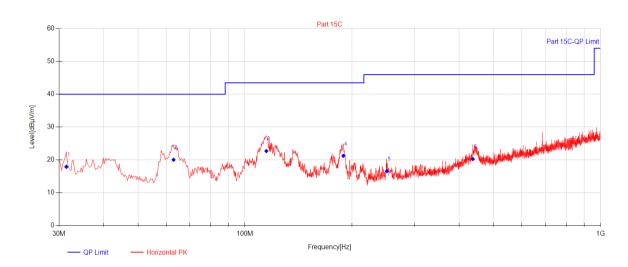


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# Radiated Spurious Emissions Radiated emission below 1GHz

Worst case Mode: BLE 1M\_Channel 00



Data	Data List													
NO.	Frequency [MHz]	Reading [dBµV]	Factor [dB]	AF [dB/m]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity				
1	31.455	41.25	-36.64	13.27	17.88	40.00	22.12	213	1	Horizontal				
2	62.98	44.29	-36.44	12.17	20.03	40.00	19.97	254	287	Horizontal				
3	114.875	47.16	-36.15	11.67	22.68	43.50	20.82	169	91	Horizontal				
4	189.08	44.13	-35.40	12.51	21.24	43.50	22.26	158	245	Horizontal				
5	250.675	39.23	-34.27	11.59	16.55	46.00	29.45	153	91	Horizontal				
6	437.4	38.11	-33.53	15.66	20.24	46.00	25.76	199	214	Horizontal				



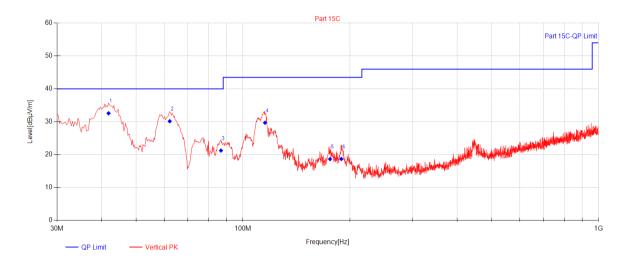
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Data	Data List												
NO.	Frequency [MHz]	Reading [dBµV]	Factor [dB]	AF [dB/m]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity			
1	41.8825	54.89	-36.25	13.91	32.56	40.00	7.44	245	237	Vertical			
2	62.2525	54.26	-36.43	12.32	30.15	40.00	9.85	184	268	Vertical			
3	86.745	48.01	-36.17	9.39	21.23	40.00	18.77	175	10	Vertical			
4	115.36	54.13	-36.15	11.72	29.70	43.50	13.80	135	338	Vertical			
5	175.7425	39.26	-35.19	14.57	18.63	43.50	24.87	199	144	Vertical			
6	189.08	41.56	-35.40	12.51	18.67	43.50	24.83	165	174	Vertical			

#### Remark:

1) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier gain. The basic equation with a sample calculation is as follows:

Value = Reading( $dB\mu V$ ) + AF(dB/m) + Factor(dB):

AF = Antenna Factor(dB/m)

Factor = Cable Factor(dB) - Preamplifier gain(dB)

Margin = Limit( $dB\mu V/m$ ) – Value( $dB\mu V/m$ )

2) All channels have been tested, but only the worst case data displayed in this report.



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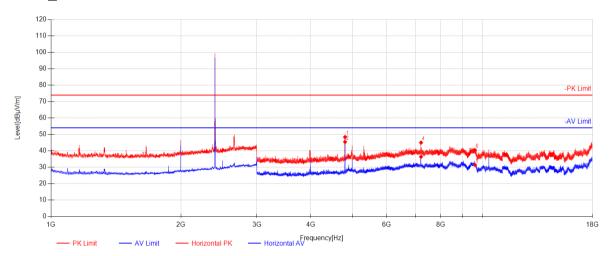


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### **Transmitter emission Above 1GHz**

#### BLE 1M\_Channel 00



Data	Data List												
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity			
1	4804.0000	61.61	32.33	-45.54	48.40	74.00	25.60	245	306	Horizontal			
2	4804	58.62	32.33	-45.54	45.41	54.00	8.59	165	55	Horizontal			
3	7206.0000	43.21	36.60	-43.44	36.37	54.00	17.63	125	28	Horizontal			
4	7206.5	51.86	36.60	-43.44	45.01	74.00	28.99	186	29	Horizontal			
5	9608.0000	32.65	38.43	-39.65	31.43	54.00	22.57	196	56	Horizontal			
6	9608.0000	41.69	38.43	-39.65	40.47	74.00	33.53	135	139	Horizontal			



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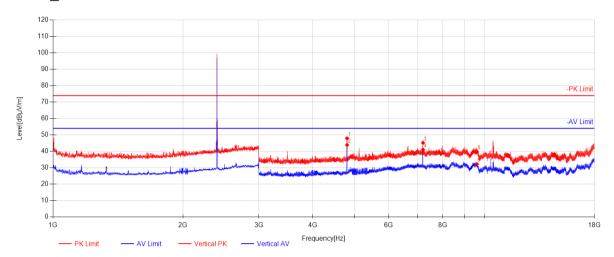
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#### BLE 1M\_Channel 00



Data	Data List												
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity			
1	4803.5	61.12	32.33	-45.54	47.91	74.00	26.09	145	112	Vertical			
2	4804.5	57.05	32.33	-45.54	43.84	54.00	10.16	126	84	Vertical			
3	7206.0000	52.03	36.60	-43.44	45.19	74.00	28.81	185	84	Vertical			
4	7206	47.87	36.60	-43.44	41.03	54.00	12.97	174	168	Vertical			
5	9608.0000	40.82	38.43	-39.65	39.60	74.00	34.40	136	360	Vertical			
6	9608.0000	33.37	38.43	-39.65	32.15	54.00	21.85	259	167	Vertical			



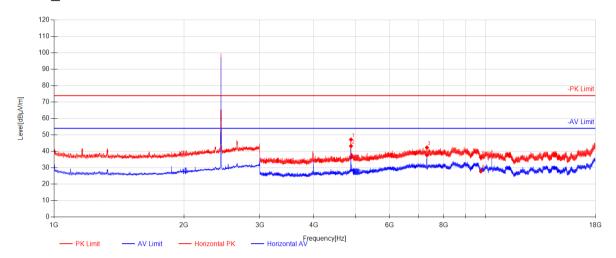
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#### **BLE 1M\_Channel 19**



Data	Data List												
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity			
1	4880.0000	60.13	32.54	-45.53	47.14	74.00	26.86	245	194	Horizontal			
2	4880	56.21	32.54	-45.53	43.22	54.00	10.78	186	29	Horizontal			
3	7320.0000	49.42	36.53	-43.68	42.27	74.00	31.73	136	281	Horizontal			
4	7320.5	44.81	36.53	-43.68	37.66	54.00	16.34	256	255	Horizontal			
5	9760.0000	37.43	38.26	-39.46	36.23	74.00	37.77	291	141	Horizontal			
6	9760.0000	29.00	38.26	-39.46	27.80	54.00	26.20	174	111	Horizontal			



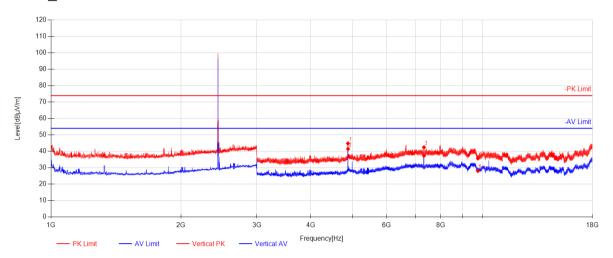
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#### **BLE 1M\_Channel 19**



Data	Data List												
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity			
1	4880.0000	57.78	32.54	-45.53	44.79	74.00	29.21	145	335	Vertical			
2	4880.5	54.44	32.55	-45.53	41.45	54.00	12.55	185	335	Vertical			
3	7320.0000	49.60	36.53	-43.68	42.45	74.00	31.55	169	83	Vertical			
4	7320.0000	44.48	36.53	-43.68	37.33	54.00	16.67	192	254	Vertical			
5	9760.0000	29.25	38.26	-39.46	28.05	54.00	25.95	135	359	Vertical			
6	9760.0000	36.88	38.26	-39.46	35.68	74.00	38.32	175	83	Vertical			



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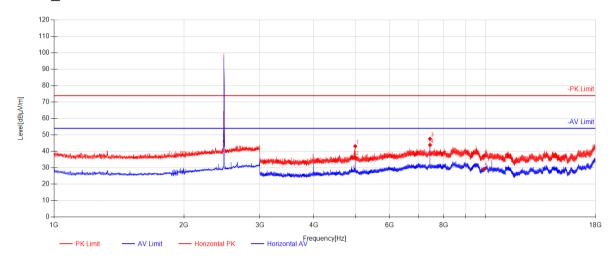
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#### **BLE 1M\_Channel 39**



Data	Data List												
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity			
1	4991.5	55.89	32.86	-45.63	43.12	74.00	30.88	245	249	Horizontal			
2	4992.5	49.01	32.86	-45.63	36.24	54.00	17.76	156	249	Horizontal			
3	7440.0000	54.44	36.47	-43.30	47.61	74.00	26.39	132	359	Horizontal			
4	7440.5	50.67	36.47	-43.30	43.84	54.00	10.16	158	359	Horizontal			
5	9920.0000	30.20	38.38	-39.31	29.27	54.00	24.73	196	222	Horizontal			
6	9920.0000	38.14	38.38	-39.31	37.21	74.00	36.79	187	277	Horizontal			



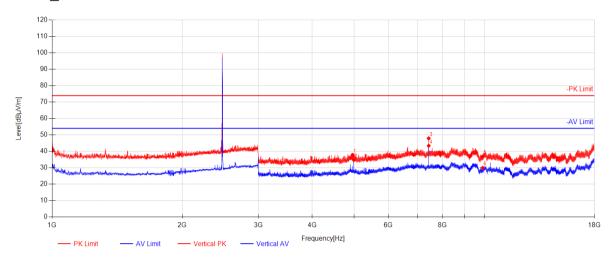
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Data	Data List												
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity			
1	4960.0000	50.57	32.77	-45.60	37.74	74.00	36.26	245	359	Vertical			
2	4992.5	47.44	32.86	-45.63	34.67	54.00	19.33	123	280	Vertical			
3	7440.0000	54.72	36.47	-43.30	47.89	74.00	26.11	265	85	Vertical			
4	7441	50.21	36.47	-43.30	43.38	54.00	10.62	222	56	Vertical			
5	9920.0000	37.83	38.38	-39.31	36.90	74.00	37.10	124	196	Vertical			
6	9920.0000	30.80	38.38	-39.31	29.87	54.00	24.13	196	251	Vertical			

#### Remark:

1) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier gain. The basic equation with a sample calculation is as follows:

Level = Reading( $dB\mu V$ ) + AF(dB/m) + Factor(dB):

AF = Antenna Factor(dB/m)

Factor = Cable Factor(dB) - Preamplifier gain(dB)

Margin = Limit( $dB\mu V/m$ ) – Level( $dB\mu V/m$ )

2) All channels have been tested, but only the worst case data displayed in this report.



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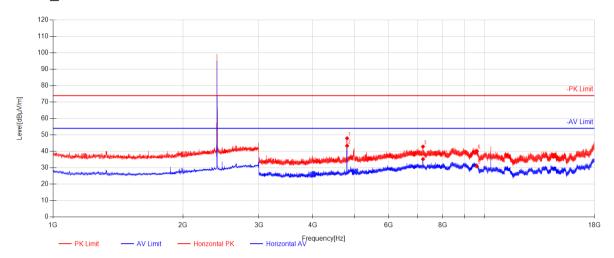
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#### BLE 2M\_Channel 00



Data	List									
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	4804.0000	61.14	32.33	-45.54	47.93	74.00	26.07	245	307	Horizontal
2	4805	56.58	32.33	-45.54	43.37	54.00	10.63	126	307	Horizontal
3	7204.5	49.69	36.60	-43.43	42.85	74.00	31.15	152	278	Horizontal
4	7205	42.07	36.60	-43.44	35.23	54.00	18.77	136	28	Horizontal
5	9608.0000	32.14	38.43	-39.65	30.92	54.00	23.08	258	28	Horizontal
6	9608.0000	41.32	38.43	-39.65	40.10	74.00	33.90	196	252	Horizontal



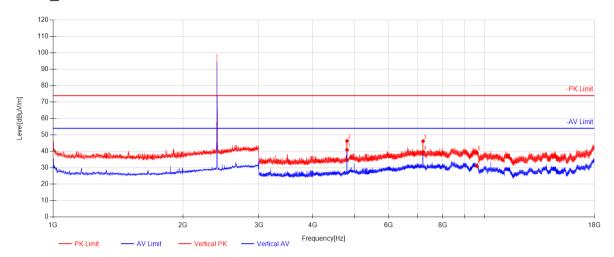
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#### BLE 2M\_Channel 00



Data List												
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity		
1	4803.5	54.07	32.33	-45.54	40.86	54.00	13.14	215	336	Vertical		
2	4804.0000	59.53	32.33	-45.54	46.32	74.00	27.68	136	112	Vertical		
3	7207.5	53.04	36.60	-43.44	46.19	74.00	27.81	258	81	Vertical		
4	7207.5	46.44	36.60	-43.44	39.59	54.00	14.41	174	55	Vertical		
5	9608.0000	40.39	38.43	-39.65	39.17	74.00	34.83	159	55	Vertical		
6	9608.0000	32.32	38.43	-39.65	31.10	54.00	22.90	136	359	Vertical		



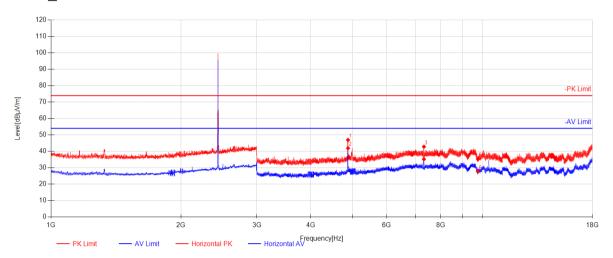
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#### **BLE 2M\_Channel 19**



Data	List									
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	4880.0000	59.92	32.54	-45.53	46.93	74.00	27.07	245	305	Horizontal
2	4880.5	54.91	32.55	-45.53	41.92	54.00	12.08	136	305	Horizontal
3	7319	49.95	36.53	-43.69	42.80	74.00	31.20	256	353	Horizontal
4	7319	42.34	36.53	-43.69	35.19	54.00	18.81	199	4	Horizontal
5	9760.0000	36.46	38.26	-39.46	35.26	74.00	38.74	184	279	Horizontal
6	9760.0000	28.94	38.26	-39.46	27.74	54.00	26.26	175	360	Horizontal



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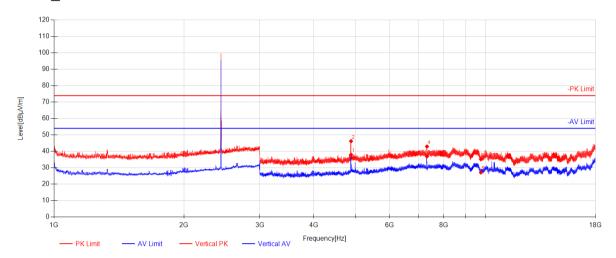
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#### **BLE 2M\_Channel 19**



Data	List									
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	4880.0000	50.90	32.54	-45.53	37.91	54.00	16.09	248	84	Vertical
2	4881	59.19	32.55	-45.53	46.20	74.00	27.80	153	84	Vertical
3	7319	44.03	36.53	-43.69	36.88	54.00	17.12	133	84	Vertical
4	7320.0000	50.08	36.53	-43.68	42.93	74.00	31.07	265	307	Vertical
5	9760.0000	28.32	38.26	-39.46	27.12	54.00	26.88	145	112	Vertical
6	9760.0000	36.38	38.26	-39.46	35.18	74.00	38.82	199	307	Vertical



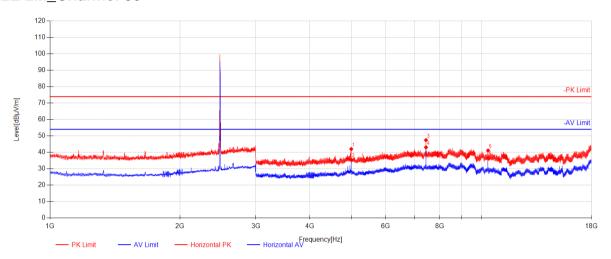
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#### **BLE 2M\_Channel 39**



Data	List									
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	4992	54.75	32.86	-45.63	41.98	74.00	32.02	245	251	Horizontal
2	4992.5	48.30	32.86	-45.63	35.53	54.00	18.47	136	251	Horizontal
3	7438.5	54.26	36.47	-43.31	47.42	74.00	26.58	258	359	Horizontal
4	7439	49.88	36.47	-43.30	43.05	54.00	10.95	196	354	Horizontal
5	10360	41.26	38.85	-39.04	41.07	74.00	32.93	174	55	Horizontal
6	10360.5	36.68	38.85	-39.04	36.49	54.00	17.51	152	55	Horizontal



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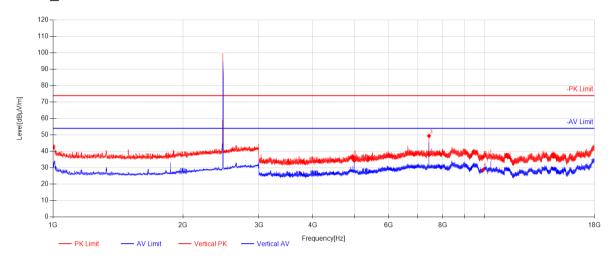
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#### **BLE 2M\_Channel 39**



Data	List									
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	4960.0000	49.51	32.77	-45.60	36.68	74.00	37.32	245	360	Vertical
2	4992.5	47.11	32.86	-45.63	34.34	54.00	19.66	136	281	Vertical
3	7440.0000	56.23	36.47	-43.30	49.40	74.00	24.60	258	84	Vertical
4	7440.0000	44.60	36.47	-43.30	37.77	54.00	16.23	196	252	Vertical
5	9920.0000	29.49	38.38	-39.31	28.56	54.00	25.44	175	4	Vertical
6	9920.0000	37.39	38.38	-39.31	36.46	74.00	37.54	142	197	Vertical



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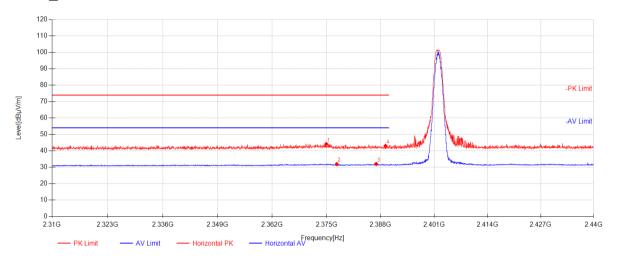


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### Restricted bands around fundamental frequency

#### BLE 1M\_Channel 00



Data	Data List												
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity			
1	2374.9567	40.30	27.43	-23.57	44.15	74.00	29.85	145	226	Horizontal			
2	2377.47	28.04	27.43	-23.57	31.90	54.00	22.10	145	226	Horizontal			
3	2386.96	28.14	27.43	-23.57	32.00	54.00	22.00	145	226	Horizontal			
4	2389.2133	39.18	27.43	-23.57	43.04	74.00	30.96	145	226	Horizontal			



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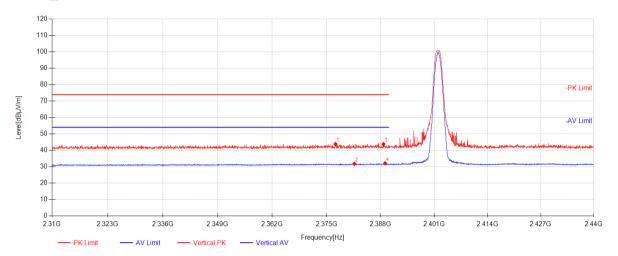
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#### **BLE 1M\_Channel 00**



Data	Data List												
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity			
1	2377.1667	39.95	27.43	-23.57	43.81	74.00	30.19	178	281	Vertical			
2	2381.7167	27.92	27.43	-23.57	31.78	54.00	22.22	178	281	Vertical			
3	2388.7367	39.94	27.43	-23.57	43.80	74.00	30.20	178	281	Vertical			
4	2389.1267	28.25	27.43	-23.57	32.11	54.00	21.89	178	281	Vertical			



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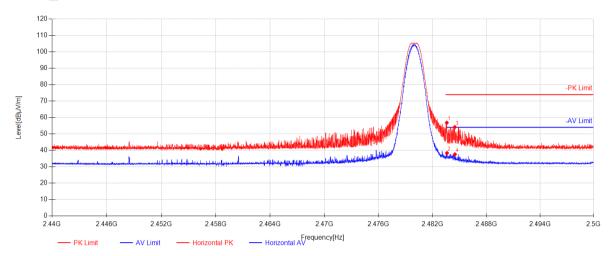
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#### **BLE 1M\_Channel 39**



Data	List									
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2483.5975	52.66	27.72	-23.54	56.83	74.00	17.17	225	191	Horizontal
2	2483.62	34.18	27.72	-23.54	38.35	54.00	15.65	225	191	Horizontal
3	2484.49	49.99	27.72	-23.54	54.16	74.00	19.84	225	191	Horizontal
4	2484.505	33.38	27.72	-23.54	37.55	54.00	16.45	225	191	Horizontal



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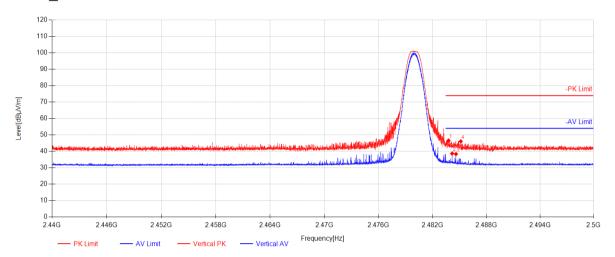
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#### **BLE 1M\_Channel 39**



Data	Data List												
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity			
1	2483.7925	42.40	27.72	-23.54	46.57	74.00	27.43	236	43	Vertical			
2	2484.19	34.48	27.72	-23.54	38.65	54.00	15.35	236	43	Vertical			
3	2484.6175	34.18	27.72	-23.54	38.35	54.00	15.65	236	43	Vertical			
4	2485.1575	41.91	27.72	-23.54	46.09	74.00	27.91	236	43	Vertical			



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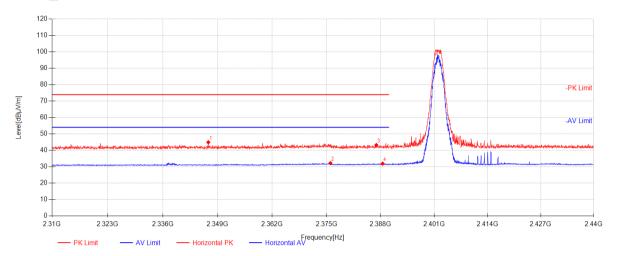
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#### BLE 2M\_Channel 00



Data	Data List												
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity			
1	2346.79	41.07	27.41	-23.58	44.91	74.00	29.09	169	213	Horizontal			
2	2375.9533	28.32	27.43	-23.57	32.18	54.00	21.82	169	213	Horizontal			
3	2387.0033	39.33	27.43	-23.57	43.19	74.00	30.81	169	213	Horizontal			
4	2388.52	28.03	27.43	-23.57	31.89	54.00	22.11	169	213	Horizontal			



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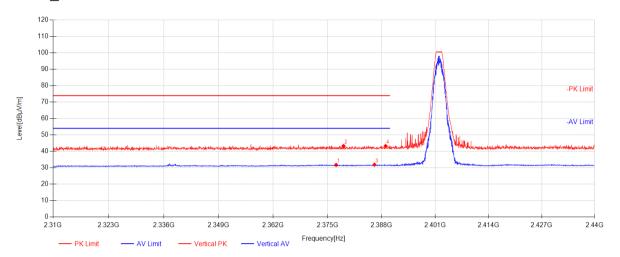
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#### BLE 2M\_Channel 00



Data	Data List												
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity			
1	2377.08	27.85	27.43	-23.57	31.71	54.00	22.29	152	34	Vertical			
2	2378.8567	39.38	27.43	-23.57	43.24	74.00	30.76	152	34	Vertical			
3	2386.31	28.00	27.43	-23.57	31.86	54.00	22.14	152	34	Vertical			
4	2388.9967	39.40	27.43	-23.57	43.26	74.00	30.74	152	34	Vertical			



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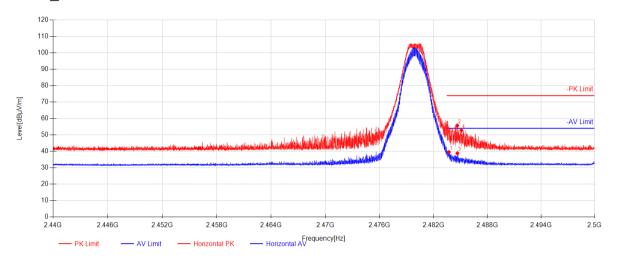
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#### **BLE 2M\_Channel 39**



Data List										
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2483.725	35.37	27.72	-23.54	39.54	54.00	14.46	211	189	Horizontal
2	2484.6475	51.53	27.72	-23.54	55.70	74.00	18.30	211	189	Horizontal
3	2484.6625	34.66	27.72	-23.54	38.83	54.00	15.17	211	189	Horizontal
4	2485.105	48.59	27.72	-23.54	52.77	74.00	21.23	211	189	Horizontal



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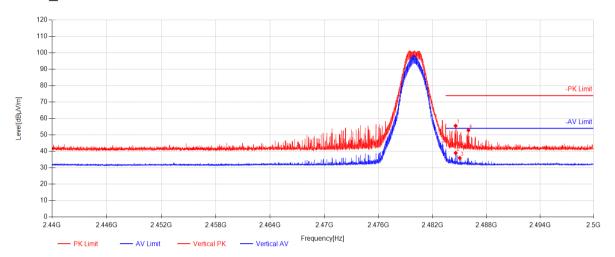
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Data List										
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2484.58	51.38	27.72	-23.54	55.55	74.00	18.45	236	43	Vertical
2	2484.5875	34.81	27.72	-23.54	38.98	54.00	15.02	236	43	Vertical
3	2485.03	31.75	27.72	-23.54	35.93	54.00	18.07	236	43	Vertical
4	2486.005	48.68	27.72	-23.54	52.86	74.00	21.14	236	43	Vertical

#### Remark:

1) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier gain. The basic equation with a sample calculation is as follows:

Level = Reading( $dB\mu V$ ) + AF(dB/m) + Factor(dB):

AF = Antenna Factor(dB/m)

Factor = Cable Factor(dB) - Preamplifier gain(dB)

Margin = Limit( $dB\mu V/m$ ) – Level( $dB\mu V/m$ )

---End of Report---



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