

Report No.: SEWM2307000299RG01

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TEST REPORT

Application No.: SEWM2307000299RG

Applicant: Quectel Wireless Solutions Co., Ltd.

Address of Applicant:

Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road,

Might and District Changhai China 200022

Minhang District, Shanghai, China 200233

Manufacturer: Quectel Wireless Solutions Co., Ltd.

Address of Manufacturer: Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road,

Minhang District, Shanghai, China 200233

EUT Description: Bluetooth Module

Model No.: HCM111Z

Trade Mark: Quectel

FCC ID: XMR2023HCM111Z

Standards: FCC 47 CFR Part 2, Subpart J

FCC 47 CFR Part 15, Subpart C

Date of Receipt: 2023/07/31

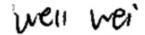
Date of Test: 2023/08/01 to 2023/08/14

Date of Issue: 2023/08/15

Test Result : PASS *

* 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		2023/08/15		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 C63.10-2020 Section 6.2	Clause 4.2	PASS
Duty cycle		ANSI C63.10-2020 Section 11.6	Clause 4.3	For Report Purpose
Conducted Output Power	15.247 (b)(3)	ANSI C63.10-2020 Section11.9.1.2	Clause 4.4	PASS
DTS (6 dB) Bandwidth & 99% Occupied Bandwidth	15.247 (a)(2)	ANSI C63.10-2020 Section 11.8 Option 2 / 6.9.3	Clause 4.5	PASS
Power Spectral Density	ower Spectral Density 15.247 (e)		Clause 4.6	PASS
Band-edge for RF Conducted Emissions	15.247(d)	ANSI C63.10-2020 Section 11.11	Clause 4.7	PASS
RF Conducted Spurious Emissions	15.247(d)	ANSI C63.10-2020 Section 11.11	Clause 4.8	PASS
Radiated Spurious Emissions	15.205/15.209	ANSI C63.10-2020 Section 11.12	Clause 4.9	PASS
Restricted bands around fundamental frequency (Radiated Emission)	15.205/15.209	ANSI C63.10-2020 Section 11.12	Clause 4.10	PASS



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3 General Information

3.1 Details of Client

Applicant:	Quectel Wireless Solutions Co., Ltd.
Address of Applicant:	Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai, China 200233
Manufacturer:	Quectel Wireless Solutions Co., Ltd.
Address of Manufacturer:	Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai, China 200233

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

_		1			
EUT Description:	Bluetooth Module				
Model No.:	HCM111Z				
Trade Mark:	Quectel				
Hardware Version:	R1.0				
Software Version:	HCM111ZAAR01A02				
SN:	RF Conducted	E1N23GK0N000098			
SIN.	RSE & AC power line	E1N32GK0N000022			
Operation Frequency:	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 V5.3				
Modulation Type:	GFSK				
Number of Channel:	40				
Dotoo Typo*i	⊠Provided by client				
Rates Type*:	1M PHY 2M PHY				
Antenna Type:	PIFA Antenna				
	-3.7dBi(Ant0)				
Antenna Gain:	Note: The antenna gain are derived from the gain information report provided by the manufacturer.				
RF Cable:	1.0dB				
Power Supply:	3.8V(DC Supply)				
As above information is provided suitability, reliability or/and integrit		ant. SGS is not liable to the accuracy,			



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	Operation Frequency of each channel							
Channel	hannel Frequency Channel I		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

Environment Parameter	101.0 kPa Selected Values During Tests					
Relative Humidity	44-46 % RH Ambient					
Value	Temperature(°C) Voltage(Vdc)					
NTNV	22~23	3.3				
Remark:						

NV: Normal Voltage NT: Normal Temperature

3.6 Description of Support Units

The EUT has been tested as an independent unit.



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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 PIFA Antenna and no consideration of replacement. The best case gain of the antenna is -3.7dBi(Ant0). *

*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 C63.10-2020 Section 6.2				
Test Frequency Range:	150kHz to 30MHz				
Receiver Setup:	RBW = 9kHz, VBW = 30	kHz			
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 disturbance voltage test was conducted in a shielder room.				
	 room. 2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50Ω/50μH + 5Ω linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded. 3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane. 4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2. 5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to 				



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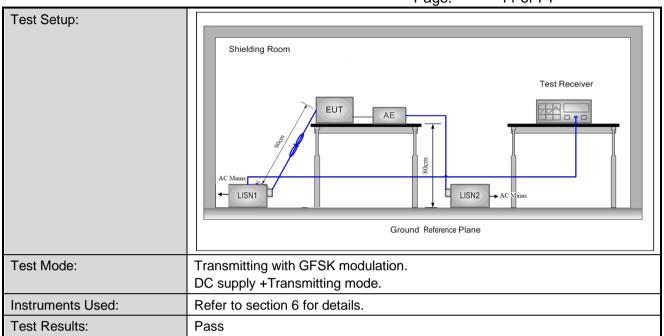
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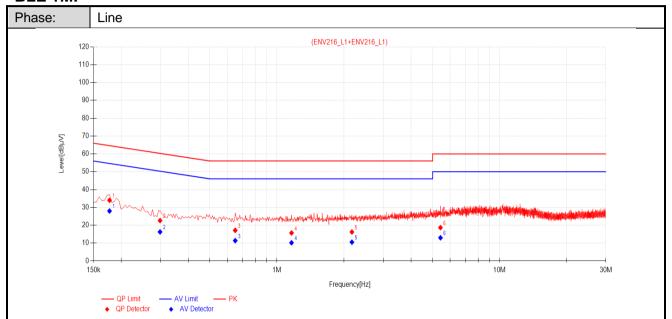
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Measurement Data

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:



Final	Final 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	0.1770	11.73	22.25	33.98	64.63	30.65	16.24	27.97	54.63	26.66	PASS
2	0.2985	11.63	10.98	22.61	60.28	37.67	4.62	16.25	50.28	34.03	PASS
3	0.6495	11.65	5.47	17.12	56.00	38.88	-0.30	11.35	46.00	34.65	PASS
4	1.1625	11.72	3.95	15.67	56.00	40.33	-1.55	10.17	46.00	35.83	PASS
5	2.1705	11.73	4.47	16.20	56.00	39.80	-1.23	10.50	46.00	35.50	PASS
6	5.4240	11.83	6.83	18.66	60.00	41.34	1.13	12.96	50.00	37.04	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[$dB\mu V$]



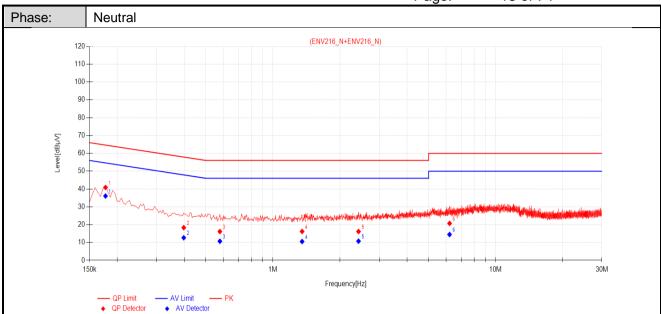
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Final	Final Data List											
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1	0.1770	11.73	29.15	40.88	64.63	23.75	24.34	36.07	54.63	18.56	PASS	
2	0.3975	11.62	6.70	18.32	57.91	39.59	1.04	12.66	47.91	35.25	PASS	
3	0.5775	11.62	4.52	16.14	56.00	39.86	-0.92	10.70	46.00	35.30	PASS	
4	1.3515	11.73	4.46	16.19	56.00	39.81	-1.18	10.55	46.00	35.45	PASS	
5	2.4225	11.73	4.44	16.17	56.00	39.83	-0.98	10.75	46.00	35.25	PASS	
6	6.2115	11.87	8.85	20.72	60.00	39.28	2.62	14.49	50.00	35.51	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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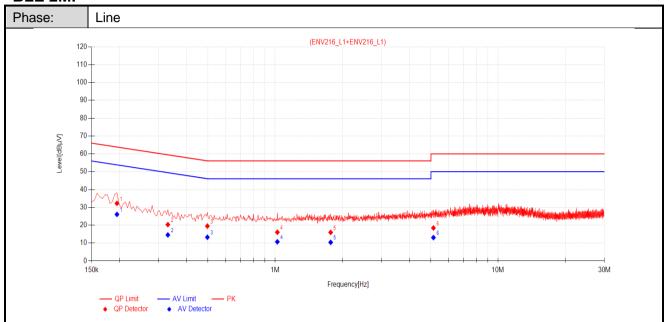
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BLE 2M:



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1	0.1950	11.67	20.55	32.22	63.82	31.60	14.37	26.04	53.82	27.78	PASS	
2	0.3300	11.62	8.68	20.30	59.45	39.15	2.92	14.54	49.45	34.91	PASS	
3	0.4965	11.60	7.89	19.49	56.06	36.57	1.64	13.24	46.06	32.82	PASS	
4	1.0230	11.72	4.31	16.03	56.00	39.97	-1.05	10.67	46.00	35.33	PASS	
5	1.7745	11.73	4.20	15.93	56.00	40.07	-1.36	10.37	46.00	35.63	PASS	
6	5.1315	11.82	6.61	18.43	60.00	41.57	1.21	13.03	50.00	36.97	PASS	

Remark

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



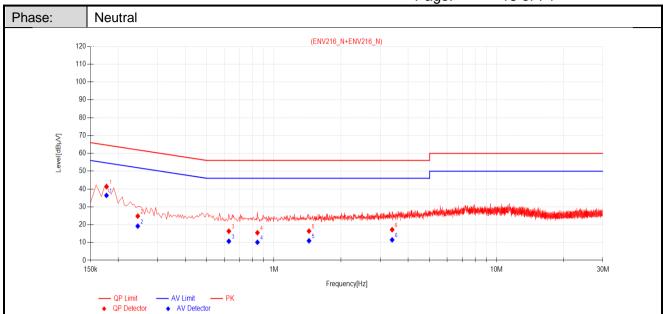
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Final	Final Data List											
NO.	Frequency [MHz]	Factor [dB]	QP Reading [dBµV]	QP Value [dBµV]	QP Limit [dBµV]	QP Margin [dB]	AV Reading [dBµV]	AV Value [dBµV]	AV Limit [dBµV]	AV Margin [dB]	Verdict	
1	0.1770	11.73	29.62	41.35	64.63	23.28	24.67	36.40	54.63	18.23	PASS	
2	0.2445	11.64	13.16	24.80	61.94	37.14	7.54	19.18	51.94	32.76	PASS	
3	0.6270	11.64	4.70	16.34	56.00	39.66	-0.94	10.70	46.00	35.30	PASS	
4	0.8430	11.70	3.77	15.47	56.00	40.53	-1.58	10.12	46.00	35.88	PASS	
5	1.4370	11.72	4.66	16.38	56.00	39.62	-0.77	10.95	46.00	35.05	PASS	
6	3.3945	11.76	5.41	17.17	56.00	38.83	-0.29	11.47	46.00	34.53	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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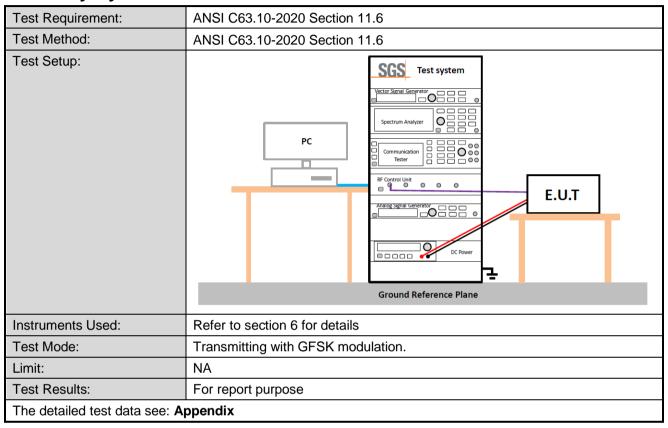


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4.3 Duty Cycle





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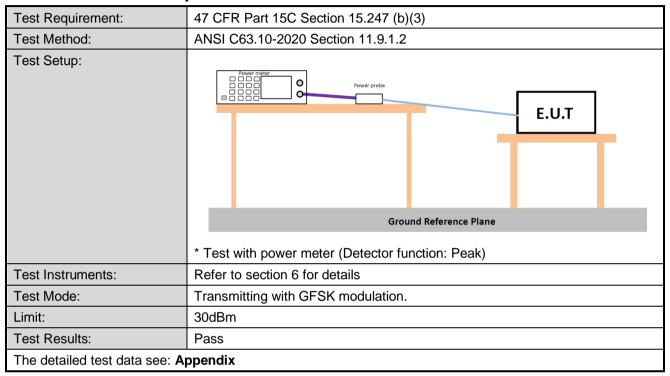


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4.4 Conducted Output Power





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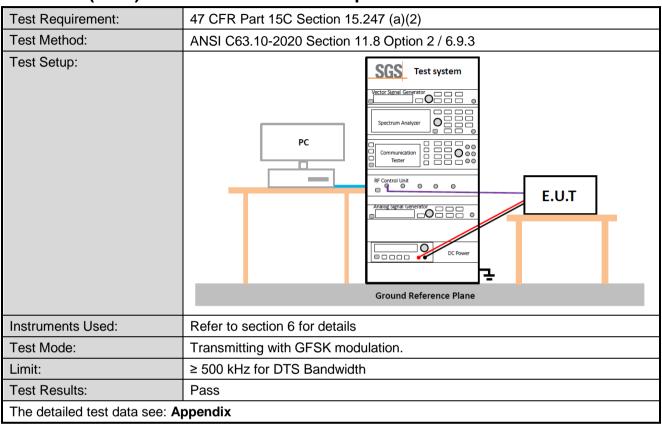
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4.5 DTS (6 dB) Bandwidth & 99% Occupied Bandwidth





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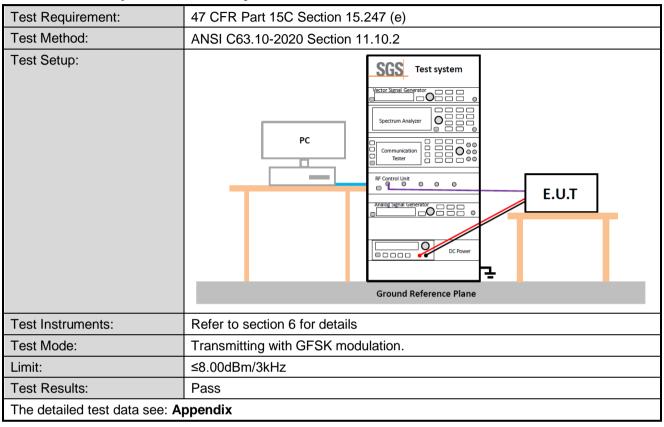


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4.6 Power Spectral Density





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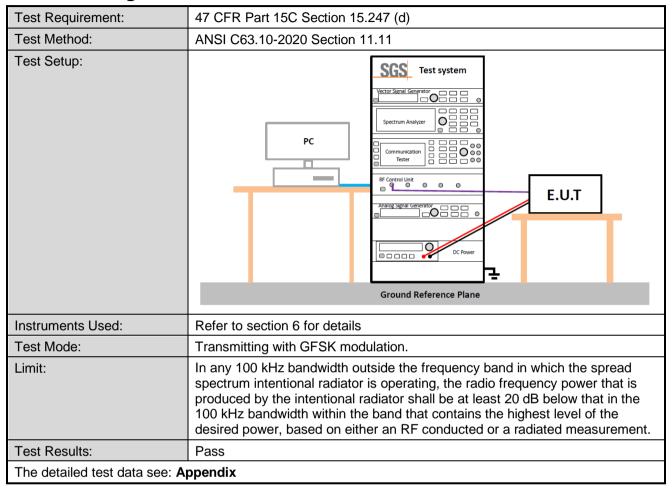
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4.7 Band-edge for RF Conducted Emissions





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4.8 RF Conducted Spurious Emissions

Test Requirement:	47 CFR Part 15C Section 15.247 (d)						
Test Method:	ANSI C63.10-2020 Section 11.11						
Test Setup:	PC Sector Signal Generator Spectrum Analyzer Spectrum Analy						
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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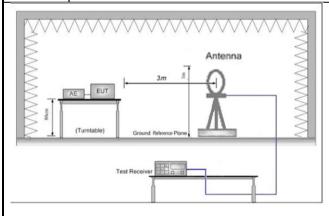
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4.9 Radiated Spurious Emissions

Test Requirement:	47 CFR Part 15C Section 15.209 and 15.205							
Test Method:	ANSI C63.10-2020 Section 11.12							
Test Site:	Measurement Distance:	3m (Semi-Anecho	ic Chamber)					
Test Frequency:	9kHz ~ 25GHz							
Limit:	Frequency	Frequency Field strength Limit (microvolt/meter) (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	rmitted avera	age emission lir	nit				

Test Setup:



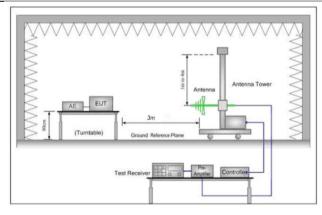


Figure 1. Below 30MHz

Figure 2. 30MHz to 1GHz



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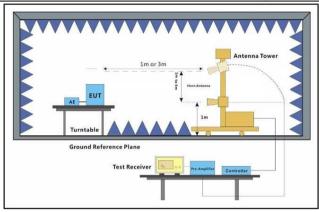


Figure 3. Above 1 GHz

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 (Distance from antenna to EUT is 1m for measurements >18GHz).
- 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(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.
- f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- g. Test the EUT in the lowest channel, the middle channel ,the Highest channel.
- h. 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.
- i. Repeat above procedures until all frequencies measured was complete.
- j. 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
- k. 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 30MHz

- RBW = 10 kHz
- VBW = 30 kHz
- Detector = Peak & Average & Quasi-peak
- Trace mode = max hold



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	 Measurements Below 1000MHz RBW = 120 kHz VBW = 300 kHz Detector = Quasi-peak Trace mode = max hold 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 = 10 Hz, when duty cycle is no less than 98 percent. VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.
Exploratory Test Mode:	Transmitting with GFSK modulation. DC supply +Transmitting mode.
Final Test Mode:	Transmitting with GFSK modulation. Pretest the EUT at DC supply +Transmitting mode, For below 1GHz part, through pre-scan all channels, but 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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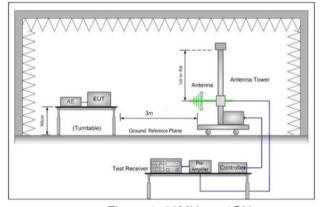
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4.10 Restricted bands around fundamental frequency

Test Requirement:	47 CFR Part 15C Section 15.209 and 15.205						
Test Method:	ANSI C63.10-2020 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 1GHz	54.0	Average Value				
	Above IGHZ	74.0	Peak Value				

Test Setup:



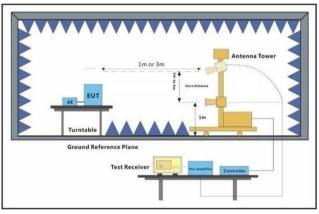


Figure 1. 30MHz to 1GHz

Figure 2. 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.
- 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.
- 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.
- The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- 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:	Measurements Below 1000MHz RBW = 120 kHz VBW = 300 kHz Detector = Quasi-peak Trace mode = max hold 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 ≥ 1 MHz VBW = 1 MHz Measurements Above 1000MHz Trace mode = max hold Average Measurements Above 1000MHz RBW = 1 MHz VBW = 10 Hz, when duty cycle is no less than 98 percent. VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its
Exploratory Test Mode:	maximum power control level for the tested mode of operation. Transmitting with GFSK modulation. DC supply +Transmitting mode.
Final Test Mode:	Transmitting with GFSK modulation. Pretest the EUT at DC supply +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)

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)
8	Radiated Emission	± 4.88dB (30M -1GHz)
0	Radiated Effission	± 4.75dB (1GHz to 18GHz)
		± 4.77dB (Above 18GHz)

Remark:

The Ulab (lab Uncertainty) is less than Ucispi/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

o Equipin	OH LIST									
RF Test Equipment										
Test 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	2023/02/06	2024/02/05					
Measurement Software	Tonscend	JS1120-3 Test System V 3.3.20	SUWI-02-09-09	NCR	NCR					
Signal Analyzer	ROHDE& SCHWARZ	FSW43	SUWI-01-02-04	2023/05/11	2024/05/10					
Temperature Chamber	ESPEC	SU-242	SUWI-01-13-01	2023/02/06	2024/02/05					
DC Power Supply	HYELEC	HY3005B	SUWI-01-18-01	2023/02/06	2024/02/05					
Power meter	Anritsu	ML2495A	SUWI-01-31-01	2022/11/23	2023/11/22					
Pulse power sensor	Anritsu	MA2411B	SUWI-01-32-01	2022/11/23	2023/11/22					

Conduction Test Equipment										
Test 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					
Test receiver	ROHDE&SCHWARZ	ESR7	SUWI-01-10-01	2023/02/08	2024/02/07					
Temperature and humidity meter	MingGao	TH101B	SUWI-01-01-06	2023/02/07	2024/02/06					
Artificial network	ROHDE&SCHWARZ	ENV216	SUWI-01-19-03	2023/02/08	2024/02/07					
Artificial network	ROHDE&SCHWARZ	ENV216	SUWI-01-19-04	2023/02/08	2024/02/07					
Measurement Software	Tonscend	JS32-CE V4.0.0.2	SUWI-02-09-05	NCR	NCR					
DC Power Supply	HYELEC	HY3005B	SUWI-01-18-01	2023/02/06	2024/02/05					



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			raye.	29 01 74						
	RSE Test System									
Test Equipment	Manufacturer	Model No.	Inventory No.	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-01-01-13	2023/02/07	2024/02/06					
Signal Analyzer	ROHDE&SCHWARZ	FSW43	SUWI-01-02-04	2023/05/11	2024/05/10					
Signal Analyzer	KEYSIGHT	N9020A	SUWI-01-02-06	2022/11/23	2023/11/22					
Test receiver	ROHDE&SCHWARZ	ESR7	SUWI-01-10-01	2023/02/08	2024/02/07					
Receiving antenna	SCHWRZBECK MESS-ELEKTRONIK	VULB 9168	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	2023/05/12	2024/05/11					
Active Loop Antenna	SCHWRZBECK MESS-ELEKTRONIK	FMZB 1519B	SUWI-01-21-01	2023/05/13	2024/05/12					
Amplifier	Tonscend	TAP9K3G32	SUWI-01-14-06	2022/11/23	2023/11/22					
Amplifier	Tonscend	TAP01018050	SUWI-01-14-04	2022/11/23	2023/11/22					
Amplifier	Tonscend	TAP30M7G30	SUWI-01-14-05	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 BLE 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	Ant0	2402	0.616	2401.772	2402.388	≥0.5	PASS
BLE_1M	Ant0	2440	0.632	2439.768	2440.400	≥0.5	PASS
BLE_1M	Ant0	2480	0.612	2479.776	2480.388	≥0.5	PASS
BLE_2M	Ant0	2402	1.088	2401.544	2402.632	≥0.5	PASS
BLE_2M	Ant0	2440	1.208	2439.472	2440.680	≥0.5	PASS
BLE_2M	Ant0	2480	1.092	2479.540	2480.632	≥0.5	PASS



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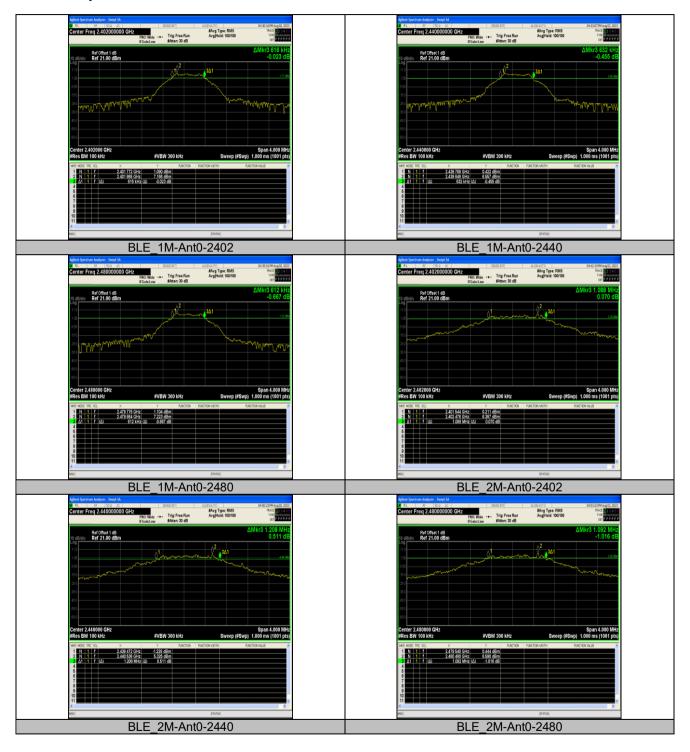


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Test Graphs





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Occupied Channel Bandwidth Test Result

TestMode	Antenna	Frequency[MHz]	OCB [MHz]	FL[MHz]	FH[MHz]	Verdict
BLE_1M	Ant0	2402	1.0175	2401.5801	2402.5976	
BLE_1M	Ant0	2440	1.0286	2439.5778	2440.6064	
BLE_1M	Ant0	2480	1.0395	2479.5745	2480.6140	For
BLE_2M	Ant0	2402	2.4513	2400.8587	2403.3100	Report Purpose
BLE_2M	Ant0	2440	2.5277	2438.8205	2441.3482	Fulpose
BLE 2M	Ant0	2480	2.5769	2478.7993	2481.3762	



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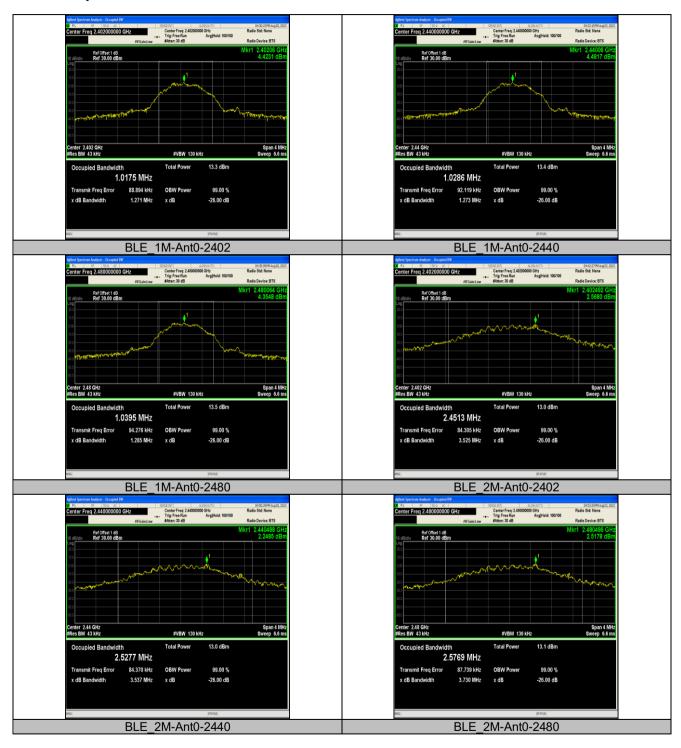


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Test Graphs





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Maximum conducted output power Test Result Peak

TestMode	Antenna	Frequency[MHz]	Conducted Peak Power[dBm]	Conducted Limit[dBm]	Verdict
BLE_1M	Ant0	2402	7.38	≤30	PASS
BLE_1M	Ant0	2440	7.34	≤30	PASS
BLE_1M	Ant0	2480	7.43	≤30	PASS
BLE_2M	Ant0	2402	7.34	≤30	PASS
BLE_2M	Ant0	2440	7.35	≤30	PASS
BLE_2M	Ant0	2480	7.44	≤30	PASS



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Maximum power spectral density Test Result

TestMode	Antenna	Frequency[MHz]	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
BLE_1M	Ant0	2402	-6.63	≤8.00	PASS
BLE_1M	Ant0	2440	-6.59	≤8.00	PASS
BLE_1M	Ant0	2480	-6.62	≤8.00	PASS
BLE_2M	Ant0	2402	-9	≤8.00	PASS
BLE_2M	Ant0	2440	-8.98	≤8.00	PASS
BLE_2M	Ant0	2480	-9.07	≤8.00	PASS



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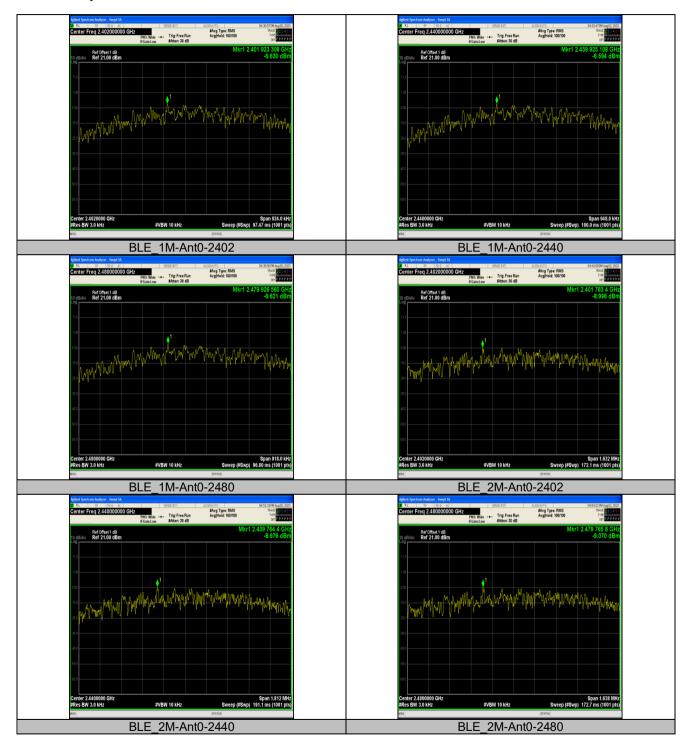


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Test Graphs





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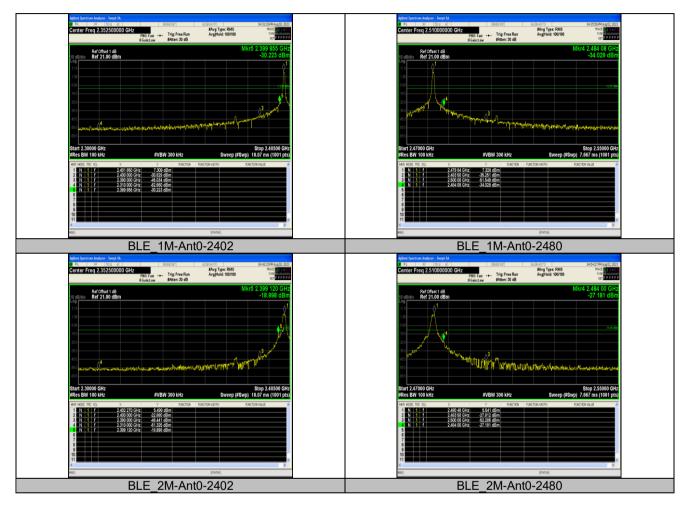


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Band edge measurements Test Graphs





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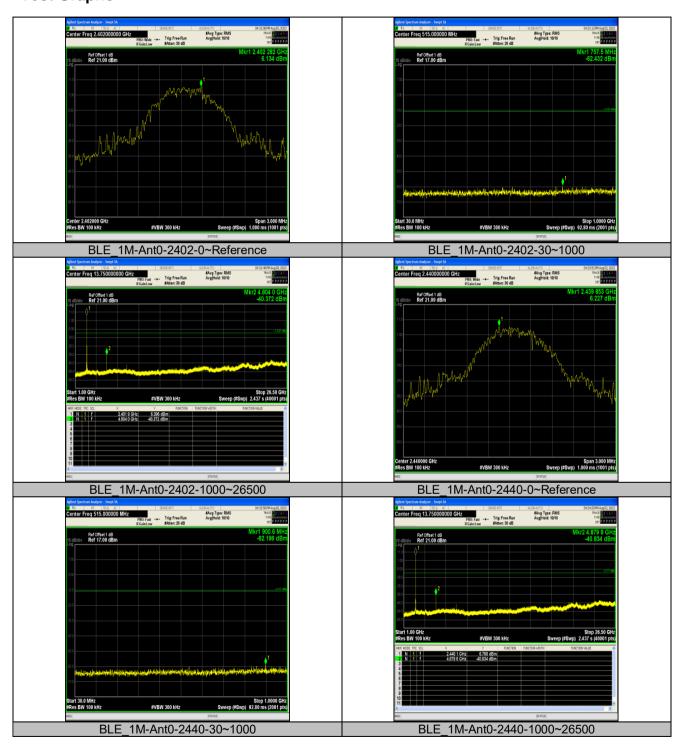


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Conducted Spurious Emission Test Graphs





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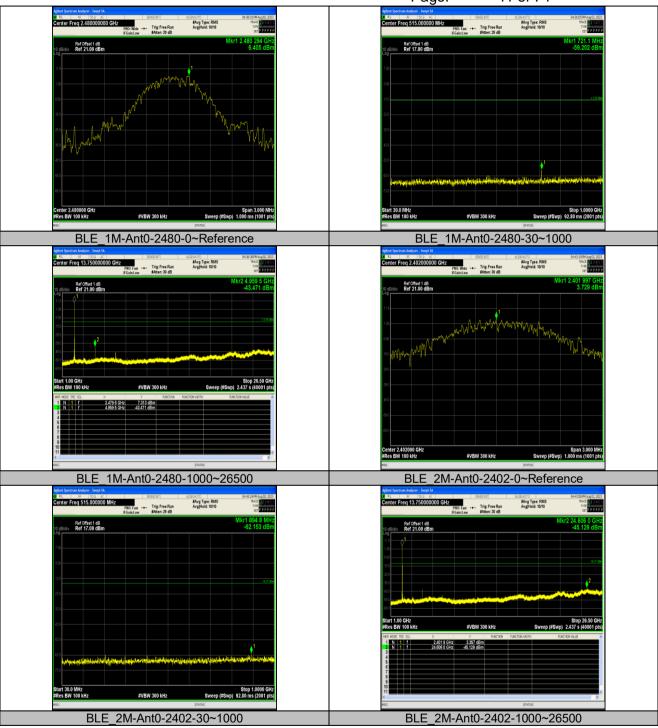
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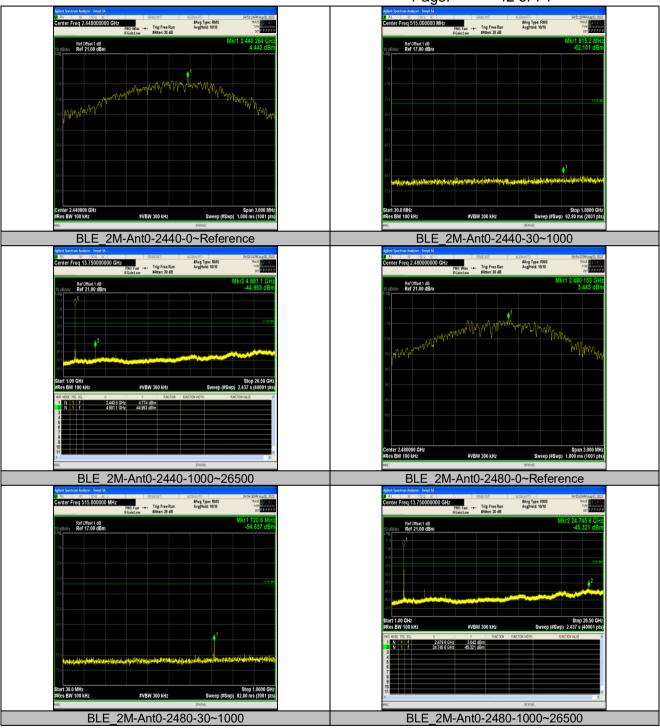
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Duty Cycle Test Result

TestMode	Antenna	Frequency[MHz]	ON Time [ms]	Period [ms]	Duty Cycle [%]	Duty Cycle Factor[dB]
BLE_1M	Ant0	2402	0.39	0.63	61.90	2.08
BLE_2M	Ant0	2402	1.06	1.88	56.38	2.49

Note:

Radiated Emission Average VBW = 1 / T

TestMode	T[ms]	Period[ms]	Duty Cycle[%]	1/T[kHz]	VBW Setting
BLE 1M	0.39	0.63	61.90	2.56410	2.7KHz
BLE 2M	1.06	1.88	56.38	0.94339	1KHz



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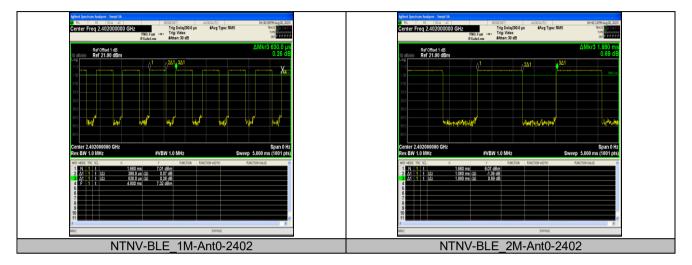


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Test Graphs





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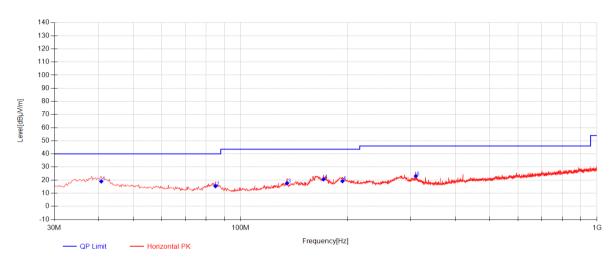


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Radiated Spurious Emissions Radiated emission below 1GHz

Worst case Mode: BLE 2M_Channel 39



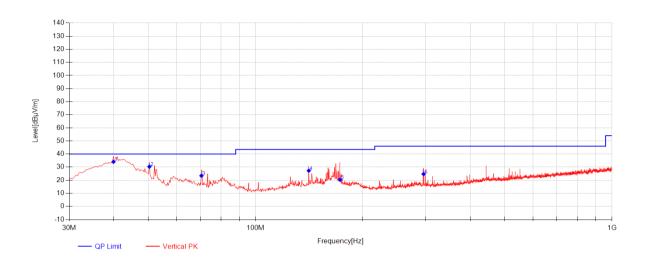
Final	Data List									
NO.	Frequency [MHz]	Reading [dBµV]	Factor [dB]	AF [dB/m]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	40.67	41.26	-36.26	14.01	19.01	40.00	20.99	158	153	Horizontal
2	85.0475	42.03	-36.03	9.37	15.36	40.00	24.64	142	313	Horizontal
3	135.0025	40.02	-35.59	13.15	17.58	43.50	25.92	166	133	Horizontal
4	170.8925	41.33	-35.15	14.43	20.62	43.50	22.88	251	203	Horizontal
5	193.2025	43.01	-35.34	11.52	19.20	43.50	24.30	132	360	Horizontal
6	310.33	44.29	-34.24	13.01	23.06	46.00	22.94	174	283	Horizontal





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Final	Final 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	39.9425	56.26	-36.27	14.06	34.05	40.00	5.95	165	78	Vertical				
2	50.37	53.01	-36.15	13.51	30.37	40.00	9.63	154	197	Vertical				
3	70.4975	49.16	-36.48	10.74	23.43	40.00	16.57	129	270	Vertical				
4	141.065	49.23	-35.52	13.54	27.26	43.50	16.24	184	280	Vertical				
5	172.59	41.03	-35.16	14.48	20.35	43.50	23.15	175	128	Vertical				
6	296.0225	46.22	-34.22	12.70	24.70	46.00	21.30	153	159	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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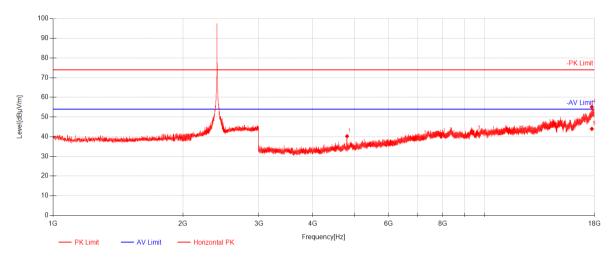
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Transmitter emission Above 1GHz

BLE 1M_Channel 00



Final	Final 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	54.80	30.97	-45.54	40.23	74.00	33.77	176	77	Horizontal			
2	7206.0000	46.74	35.78	-43.44	39.08	74.00	34.92	165	105	Horizontal			
3	9608.0000	43.93	37.46	-39.65	41.73	74.00	32.27	198	5	Horizontal			
4	17743	43.74	45.64	-34.29	55.10	74.00	18.90	142	334	Horizontal			
5	17743.0000	32.62	45.64	-34.29	43.98	54.00	10.02	175	0	Horizontal			



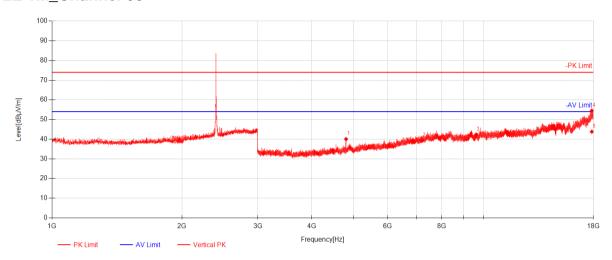


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BLE 1M_Channel 00



Final	Final 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	54.62	30.97	-45.54	40.05	74.00	33.95	241	133	Vertical			
2	7206.0000	47.00	35.78	-43.44	39.34	74.00	34.66	153	306	Vertical			
3	9608.0000	44.45	37.46	-39.65	42.25	74.00	31.75	126	5	Vertical			
4	17837	43.02	46.07	-34.59	54.50	74.00	19.50	211	219	Vertical			
5	17837.0000	32.33	46.07	-34.59	43.81	54.00	10.19	125	47	Vertical			



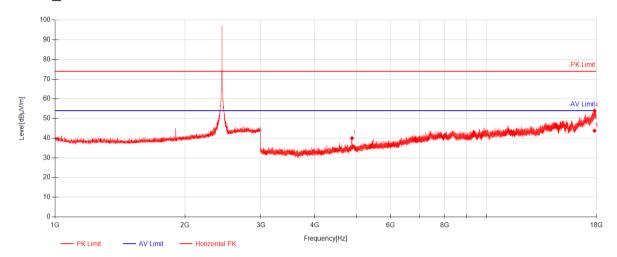


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BLE 1M_Channel 19



Final	Final 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	54.39	31.14	-45.53	39.99	74.00	34.01	203	164	Horizontal			
2	7320.0000	47.25	36.10	-43.68	39.66	74.00	34.34	174	357	Horizontal			
3	9760.0000	42.90	37.74	-39.46	41.18	74.00	32.82	185	357	Horizontal			
4	17808.5	42.64	45.94	-34.62	53.96	74.00	20.04	245	135	Horizontal			
5	17808.5000	32.48	45.94	-34.62	43.80	54.00	10.20	245	357	Horizontal			



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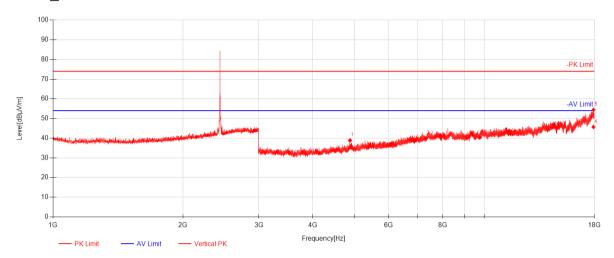


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BLE 1M_Channel 19



Final	Final 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	53.29	31.14	-45.53	38.89	74.00	35.11	244	134	Vertical			
2	7320.0000	47.52	36.10	-43.68	39.93	74.00	34.07	166	305	Vertical			
3	9760.0000	42.11	37.74	-39.46	40.39	74.00	33.61	123	21	Vertical			
4	17903.5	33.85	46.37	-34.51	45.70	54.00	8.30	245	334	Vertical			
5	17913.5	42.55	46.41	-34.52	54.44	74.00	19.56	126	134	Vertical			



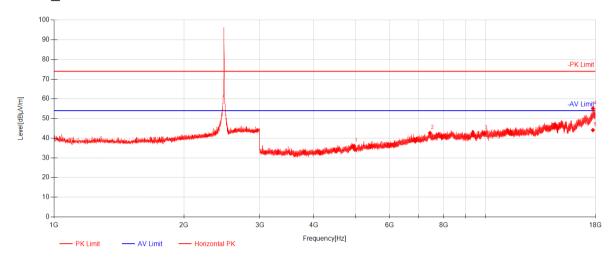


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BLE 1M_Channel 39



Final	Final 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	50.33	31.31	-45.60	36.05	74.00	37.95	184	219	Horizontal			
2	7440.0000	49.50	36.43	-43.30	42.63	74.00	31.37	175	219	Horizontal			
3	9920.0000	43.74	38.05	-39.31	42.48	74.00	31.52	169	305	Horizontal			
4	17748.5	43.78	45.67	-34.32	55.13	74.00	18.87	241	4	Horizontal			
5	17748.5000	32.77	45.67	-34.32	44.12	54.00	9.88	153	276	Horizontal			



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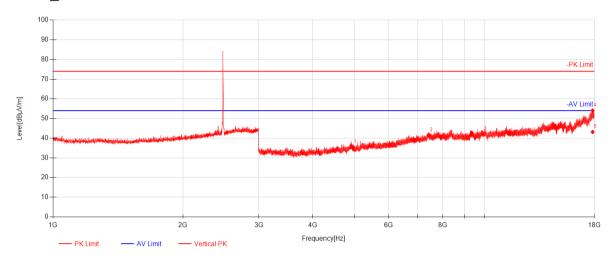


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BLE 1M_Channel 39



Final	Final 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	49.72	31.31	-45.60	35.44	74.00	38.56	125	305	Vertical			
2	7440.0000	48.34	36.43	-43.30	41.47	74.00	32.53	156	0	Vertical			
3	9920.0000	43.39	38.05	-39.31	42.13	74.00	31.87	136	48	Vertical			
4	17816.5	42.68	45.97	-34.61	54.04	74.00	19.96	241	77	Vertical			
5	17816.5000	31.80	45.97	-34.61	43.16	54.00	10.84	126	48	Vertical			



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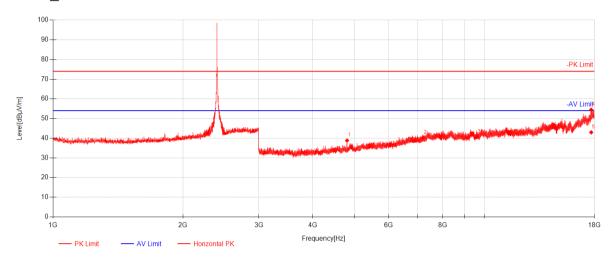


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BLE 2M Channel 00



Final	Final 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	53.39	30.97	-45.54	38.82	74.00	35.18	212	275	Horizontal			
2	7206.0000	47.91	35.78	-43.44	40.25	74.00	33.75	139	163	Horizontal			
3	9608.0000	42.70	37.46	-39.65	40.50	74.00	33.50	185	190	Horizontal			
4	17682	42.98	45.37	-33.89	54.46	74.00	19.54	214	49	Horizontal			
5	17682.0000	31.50	45.37	-33.89	42.98	54.00	11.02	159	304	Horizontal			



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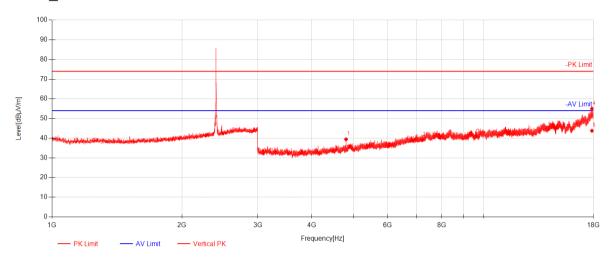


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BLE 2M_Channel 00



Final	Final 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	54.00	30.97	-45.54	39.43	74.00	34.57	214	162	Vertical				
2	7206.0000	46.65	35.78	-43.44	38.99	74.00	35.01	146	0	Vertical				
3	9608.0000	43.09	37.46	-39.65	40.89	74.00	33.11	196	1	Vertical				
4	17850	43.43	46.13	-34.57	54.99	74.00	19.01	248	333	Vertical				
5	17850.0000	32.21	46.13	-34.57	43.77	54.00	10.23	172	48	Vertical				



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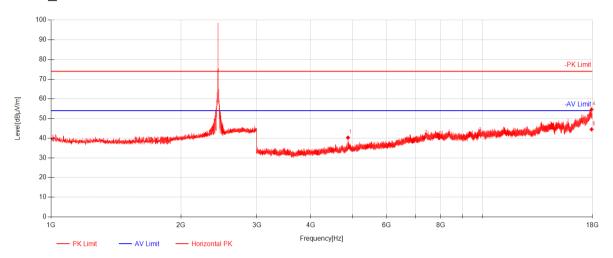


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BLE 2M_Channel 19



Final	Final 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	54.67	31.14	-45.53	40.27	74.00	33.73	248	276	Horizontal				
2	7320.0000	47.72	36.10	-43.68	40.13	74.00	33.87	182	248	Horizontal				
3	9760.0000	43.10	37.74	-39.46	41.38	74.00	32.62	136	136	Horizontal				
4	17919.5	42.69	46.44	-34.52	54.60	74.00	19.40	248	136	Horizontal				
5	17919.5000	32.58	46.44	-34.52	44.49	54.00	9.51	172	6	Horizontal				



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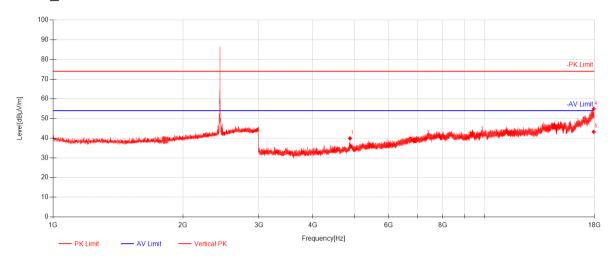


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BLE 2M_Channel 19



Final	Final 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	54.31	31.14	-45.53	39.91	74.00	34.09	125	134	Vertical				
2	7320.0000	47.44	36.10	-43.68	39.85	74.00	34.15	144	1	Vertical				
3	9760.0000	43.56	37.74	-39.46	41.84	74.00	32.16	186	108	Vertical				
4	17927.5	42.97	46.47	-34.53	54.91	74.00	19.09	248	357	Vertical				
5	17927.5000	31.32	46.47	-34.53	43.26	54.00	10.74	103	0	Vertical				



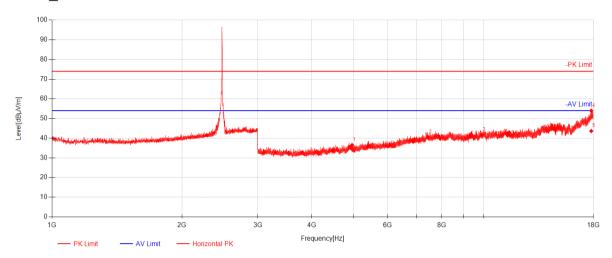


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Final	Final Data List													
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity				
1	4960.0000	50.79	31.31	-45.60	36.51	74.00	37.49	210	4	Horizontal				
2	7440.0000	47.13	36.43	-43.30	40.26	74.00	33.74	132	357	Horizontal				
3	9920.0000	42.88	38.05	-39.31	41.62	74.00	32.38	158	246	Horizontal				
4	17785	42.65	45.83	-34.54	53.94	74.00	20.06	246	0	Horizontal				
5	17785.0000	32.35	45.83	-34.54	43.64	54.00	10.36	189	1	Horizontal				



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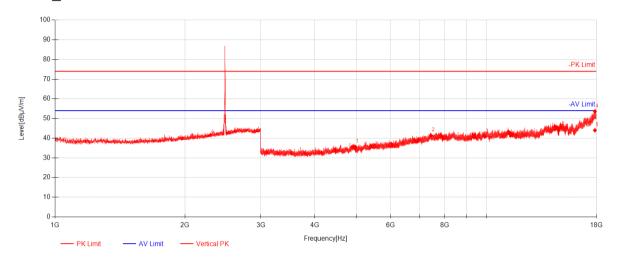


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Final	l Data List									
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	4960.0000	49.93	31.31	-45.60	35.65	74.00	38.35	175	331	Vertical
2	7440.0000	48.20	36.43	-43.30	41.33	74.00	32.67	188	356	Vertical
3	9920.0000	42.03	38.05	-39.31	40.77	74.00	33.23	136	5	Vertical
4	17851	42.12	46.13	-34.57	53.68	74.00	20.32	216	276	Vertical
5	17851.0000	32.45	46.13	-34.57	44.01	54.00	9.99	135	220	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.
- 3) Both peak and average measured complies with the limit line, so test result is "PASS".



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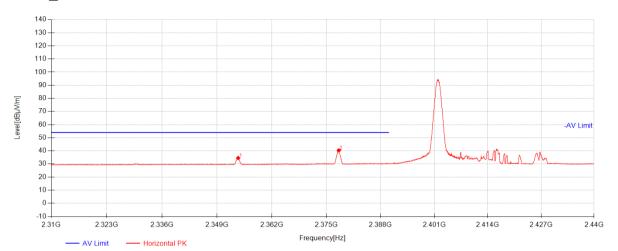
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Restricted bands around fundamental frequency

BLE 1M Channel 00



Final	Final 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	2353.9833	31.23	26.89	-23.57	34.55	54.00	19.45	126	195	Horizontal			
2	2377.99	36.95	26.96	-23.57	40.34	54.00	13.66	126	195	Horizontal			



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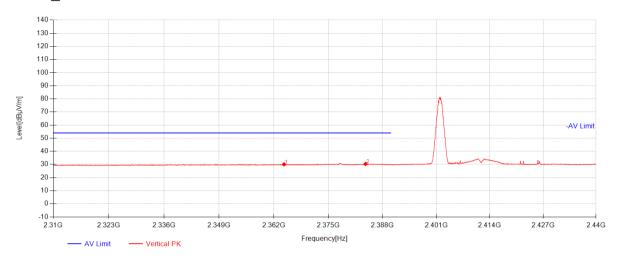


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BLE 1M_Channel 00



Final	Final 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	2364.4267	26.72	26.92	-23.57	30.07	54.00	23.93	155	25	Vertical			
2	2383.9267	26.94	26.97	-23.57	30.34	54.00	23.66	155	25	Vertical			



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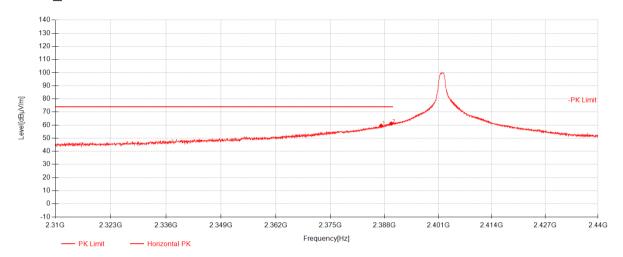


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BLE 1M_Channel 00



Final	Final 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	2387.22	56.09	26.98	-23.57	59.50	74.00	14.50	126	195	Horizontal			
2	2389.6467	57.73	26.99	-23.57	61.15	74.00	12.85	126	195	Horizontal			



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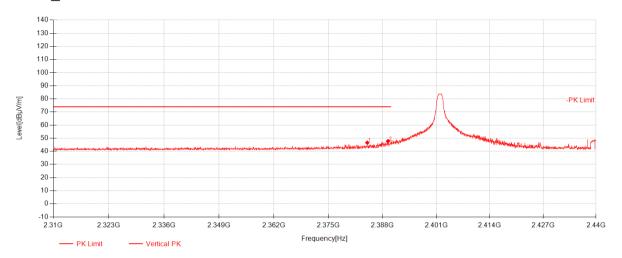


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BLE 1M_Channel 00



Final	Final 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	2384.36	43.17	26.98	-23.57	46.57	74.00	27.43	155	25	Vertical			
2	2389.3433	44.33	26.99	-23.57	47.75	74.00	26.25	155	25	Vertical			



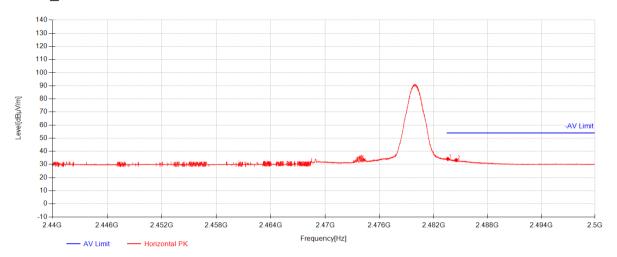


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Final	Final Data List												
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity			
1	2483.59	30.47	27.25	-23.54	34.18	54.00	19.82	233	78	Horizontal			
2	2484.52	29.58	27.26	-23.54	33.29	54.00	20.71	233	78	Horizontal			



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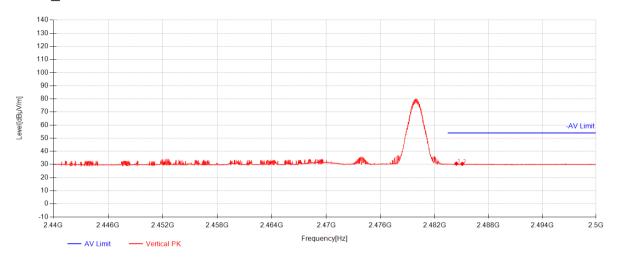


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Final	Final Data List												
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity			
1	2484.43	26.89	27.26	-23.54	30.60	54.00	23.40	214	203	Vertical			
2	2485.075	26.72	27.26	-23.54	30.43	54.00	23.57	214	203	Vertical			



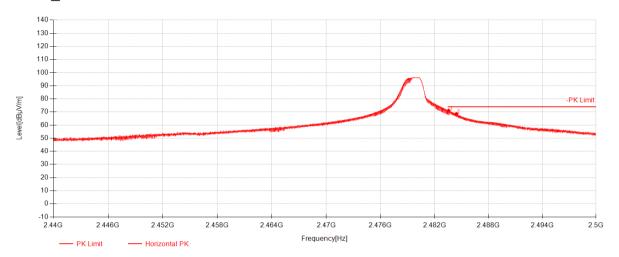


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Final	Final Data List												
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity			
1	2483.5675	67.28	27.25	-23.54	70.99	74.00	3.01	233	78	Horizontal			
2	2484.415	64.72	27.26	-23.54	68.43	74.00	5.57	233	78	Horizontal			



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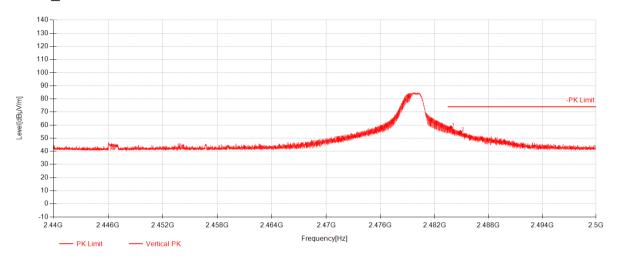


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BLE 1M_Channel 39



Final	Final 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	2483.815	54.42	27.25	-23.54	58.13	74.00	15.87	214	203	Vertical		
2	2484.8575	50.86	27.26	-23.54	54.57	74.00	19.43	214	203	Vertical		



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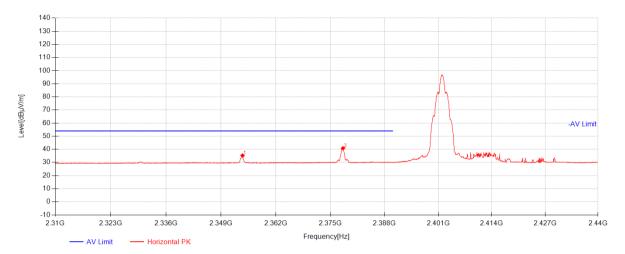


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Final	Final Data List											
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity		
1	2354.07	31.98	26.89	-23.57	35.30	54.00	18.70	133	48	Horizontal		
2	2378.0333	37.42	26.96	-23.57	40.81	54.00	13.19	133	48	Horizontal		



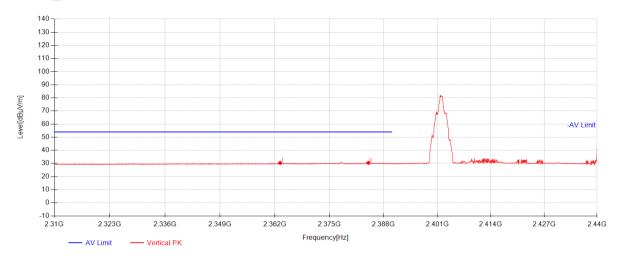


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BLE 2M_Channel 00



Final	Final 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	2363.2567	27.06	26.92	-23.57	30.40	54.00	23.60	258	194	Vertical		
2	2384.36	27.01	26.98	-23.57	30.41	54.00	23.59	258	194	Vertical		



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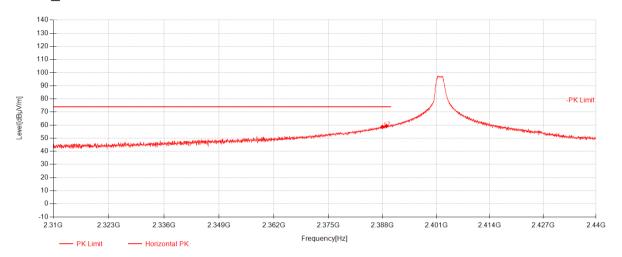


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BLE 2M_Channel 00



Final	Final 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	2388	55.16	26.99	-23.57	58.58	74.00	15.42	133	48	Horizontal		
2	2388.9533	55.80	26.99	-23.57	59.22	74.00	14.78	133	48	Horizontal		



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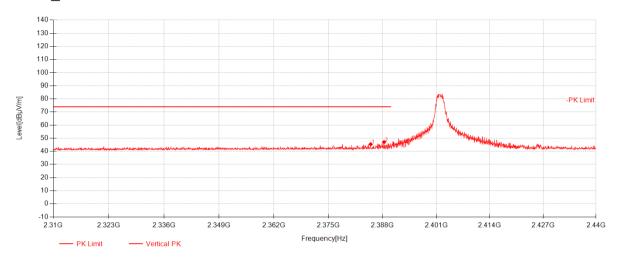


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BLE 2M_Channel 00



Final	Final 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	2385.1833	42.01	26.98	-23.57	45.42	74.00	28.58	258	194	Vertical		
2	2388.39	43.58	26.99	-23.57	47.00	74.00	27.00	258	194	Vertical		



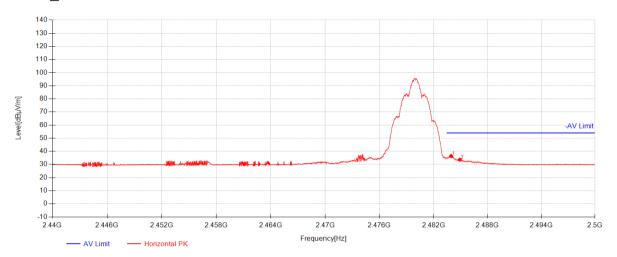


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Final	Final Data List											
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity		
1	2483.9575	32.70	27.26	-23.54	36.41	54.00	17.59	254	299	Horizontal		
2	2484.925	29.90	27.26	-23.54	33.61	54.00	20.39	254	299	Horizontal		



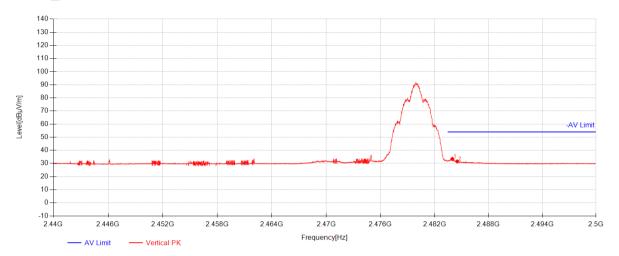


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Final	Final Data List											
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity		
1	2483.9875	29.76	27.26	-23.54	33.47	54.00	20.53	122	338	Vertical		
2	2484.52	27.82	27.26	-23.54	31.53	54.00	22.47	122	338	Vertical		



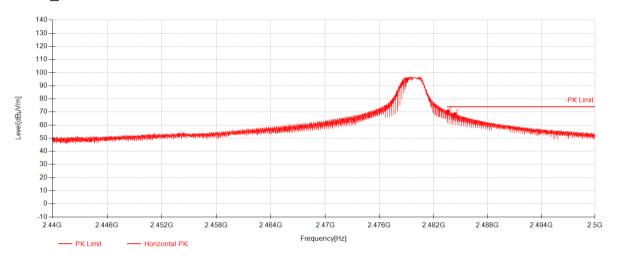


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BLE 2M_Channel 39



Final	Final 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	2483.6125	66.87	27.25	-23.54	70.58	74.00	3.42	254	299	Horizontal		
2	2484.3625	64.60	27.26	-23.54	68.31	74.00	5.69	254	299	Horizontal		



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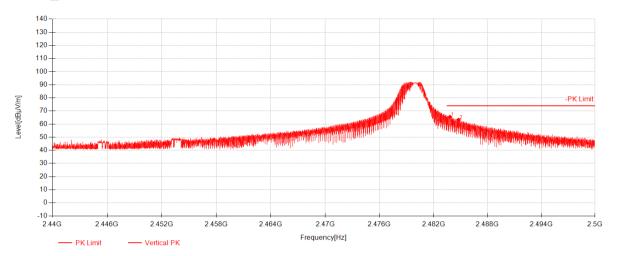


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BLE 2M_Channel 39



Final	Final 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	2483.83	61.75	27.25	-23.54	65.46	74.00	8.54	122	338	Vertical		
2	2484.775	59.50	27.26	-23.54	63.21	74.00	10.79	122	338	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 μ 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) Both peak and average measured complies with the limit line, so test result is "PASS".

---End of Report---



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