

Test Report					
1. Client					
 Name Addres 		SENA TECHNOLOGIES.Inc 19, Heolleung-ro 569-gil, Gangnam-gu, Seoul, Korea			
2. Use of	Repor	t: FCC & IC Approval			
3. Sample	e Desc	ription			
 Production Model 		-			
4. Date o	f Recei	ipt: 2022-12-12			
5. Date o	f Test :	2022-12-28 ~ 2023-01-12			
6. Test Method :		FCC Part 15 Subpart C 15.247 RSS-247 Issue 2(2017-02), RSS-GEN Issue 5(2019-03)			
7. Test Re	esults :	Refer to the test results			
This test report must not be reproduced or reproduced in any way. The results shown in this test report are the results of testing the samples provided. This test report is prepared according to the requirements of ISO / IEC 17025.					
Affirm	nation	Tested by Technical Manager Dae-Seong, Choi Jong-Myoung, Shin			
		Jan 26, 2023			
		주역회			

EMC Labs Co., Ltd.

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<u>Version</u>

TEST REPORT NO.	DATE	DESCRIPTION
KR0140-RF2301-005	Jan 26, 2023	Initial Issue

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1. Applicant & Manufacturer & Test Laboratory Information

1.1 Applicant Information

Applicant	SENA TECHNOLOGIES.Inc
Applicant Address	19, Heolleung-ro 569-gil, Gangnam-gu, Seoul, Korea
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Telephone No.	+82-2-573-7772
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1.2. Manufacturer Information

Manufacturer	SENA TECHNOLOGIES.Inc
Manufacturer Address	19, Heolleung-ro 569-gil, Gangnam-gu, Seoul, Korea

1.3 Test Laboratory Information

Laboratory	EMC Labs Co., Ltd.
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FCC Designation No.	KR0140
FCC Registration No.	580000
IC Site Registration No.	28751



2. Equipment under Test(EUT) Information

2.1 General Information

Product Name	BRP VIBE
Model Name	SP142
FCC ID	S7A-SP142
IC	8154A-SP142
Rated Voltage	DC 3.7 V

2.2 Additional Information

Operating Frequency	2 402 MHz ~ 2 480 MHz
Number of channel	40
Modulation Type	GFSK
Antenna Type	Chip Antenna
Antenna Gain	0.5 dBi
Firmware Version	1.0
Hardware Version	1.0
Test software	BlueTest3 V3.3.5

2.3 Test Frequency

Test mode	Test Frequency (MHz)			
	Low Frequency	Middle Frequency	High Frequency	
BLE	2 402	2 442	2 480	

2.4 Used Test Software Setting Value

Test Mode	Setting Item	
Test Mode	Power	
BLE	4	

2.5 Mode of operation during the test

 The EUT continuous transmission mode during the test with set at Low Channel, Middle Channel, and High Channel. To get a maximum radiated emission levels from the EUT, the EUT was moved throughout the XY, YZ, XZ planes.

2.6 Modifications of EUT

- None



3. Test Summary

Applied	FCC Rule	IC Rule	Test Items	Test Condition	Result	
\square	15.203	-	Antenna Requirement		С	
\boxtimes	15.247(a)	RSS-247 (5.2)	6 dB Bandwidth		С	
\square	_	RSS GEN (6.7)	Occupied Bandwidth (99%)	Conducted	С	
\square	15.247(b)	RSS-247 (5.4)	Maximum Peak Output Power	Conducted	С	
\square	15.247(e)	RSS-247 (5.2)	Peak Power Spectral Density		С	
	15.247(d)	RSS-247 (5.5)	Conducted Spurious Emission		С	
	15.247(d) 15.205 & 15.209	RSS-247 (5.5) RSS-GEN (8.9 & 8.10)	Radiated Spurious Emission	Radiated	С	
\square	15.207	RSS-GEN (8.8)	Conducted Emissions	AC Line Conducted	С	
<u>Note 1</u> : C=Complies NC=Not Complies NT=Not Tested NA=Not Applicable						

The sample was tested according to the following specification: ANSI C63.10:2013.

Compliance was determined by specification limits of the applicable standard according to customer requirements.



4. Used equipment on test

Description	Manufacturer	Model Name	Serial Name	Next Cal.
TEMP & HUMID CHAMBER	JFM	JFMA-001	20200929-01	2023.12.15
CONTROLLER	AMWON TECHNOLOGY	TEMI2500	S7800VK191 0707	2023.12.15
PSA SERIES SPECTRUM ANALYZER	AGILENT	E4440A	MY45304057	2023.12.15
MXG ANALOG SIGNAL GENERATOR	AGILENT	N5183A	MY50141890	2023.12.14
SYSTEM DC POWER SUPPLY	AGILENT	6674A	MY53000118	2023.12.14
VECTOR SIGNAL GENERATOR	ROHDE & SCHWARZ	SMBV100A	257524	2023.12.14
BLUETOOTH TESTER	TESCOM	TC-3000A	3000A480088	2023.12.14
DIRECTIONAL COUPLER	AGILENT	773D	2839A01855	2023.12.14
ATTENUATOR	AGILENT	8493C	73193	2023.12.14
TERMINATIOM	HEWLETT PACKARD	909D	07492	2023.12.14
POWER DIVIDER	HEWLETT PACKARD	11636A	06916	2023.12.14
SLIDE-AC	DAEKWANG TECH	SV-1023	NONE	2023.11.15
DIGITAL MULTIMETER	HUMANTECHSTORE	15B+	50561541WS	2023.12.14
ATTENUATOR	ACE RF COMM	ATT SMA 20W 20dB 8GHz	A-0820.SM20.2	2023.04.11
DC POWER SUPPLY	AGILENT	E3634A	MY40012120	2023.02.03
USB Peak Power Sensor	Anritsu	MA24408A	12321	2023.11.15
ACTIVE LOOP ANTENNA	TESEQ	HLA 6121	55685	2023.12.22
Biconilog ANT	Schwarzbeck	VULB 9160	3260	2024.01.09
Biconilog ANT	Schwarzbeck	VULB9168	902	2023.11.30
Horn Ant.	Schwarzbeck	BBHA9120D	974	2023.11.29
Horn Ant.	S/B	BBHA9120D	1497	2024.01.09
Amplifier	TESTEK	TK-PA18H	200104-L	2023.03.17
EMI TEST RECEIVER	ROHDE& SCHWARZ	ESW44	101952	2023.04.07
Test Receiver	ROHDE & SCHWARZ	ESR7	101616	2023.06.28
LISN	ROHDE & SCHWARZ	ENV216	100409	2024.01.09
PULSE LIMITER	lignex1	EPL-30	NONE	2024.01.09

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5. Antenna Requirement

Accoding to §15.203 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 shall be considered sufficient to comply with the provisions of this section. 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.

Accoding to §15.247(b)(4) e 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.

5.1 Result

Complies

(The transmitter has a Chip Antenna. The directional peak gain of the antenna is 0.5 dBi.)



6. 6 dB Bandwidth

6.1 Test Setup

Refer to the APPENDIX I.

6.2 Limit

The minimum permissible 6 dB bandwidth is 500 kHz.

6.3 Test Procedure

The bandwidth at 6 dB down from the highest in-band spectral density is measured with a spectrum analyzer connected to the EUT's antenna terminal while the EUT is operating in transmission mode at the appropriate frequencies.

- 1. Set resolution bandwidth (RBW) = 100 kHz
- 2. Set the video bandwidth (VBW) \geq 3 x RBW.
- 3. Detector = Peak.
- 4. Trace mode = Max Hold.
- 5. Sweep = Auto
- 6. Allow the trace to stabilize.
- 7. Option 1 Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.
 - Option 2 The automatic bandwidth measurement capability of an instrument may be employed using the X dB bandwidth mode with X set to 6 dB, if the functionality described above (i.e., RBW = 100 kHz, VBW ≥ 3 x RBW, peak detector with maximum hold) is implemented by the instrumentation function. When using this capability, care shall be taken so that the bandwidth measurement is not influenced by any intermediate power nulls in the fundamental emission that might be ≥ 6 dB.

6.4 Test Result

Test Mode	Test Frequency	6 dB Bandwidth (MHz)	Occupied Bandwidth (MHz)
	Low	0.713	1.043
BLE	Middle	0.721	1.044
	High	0.707	1.040

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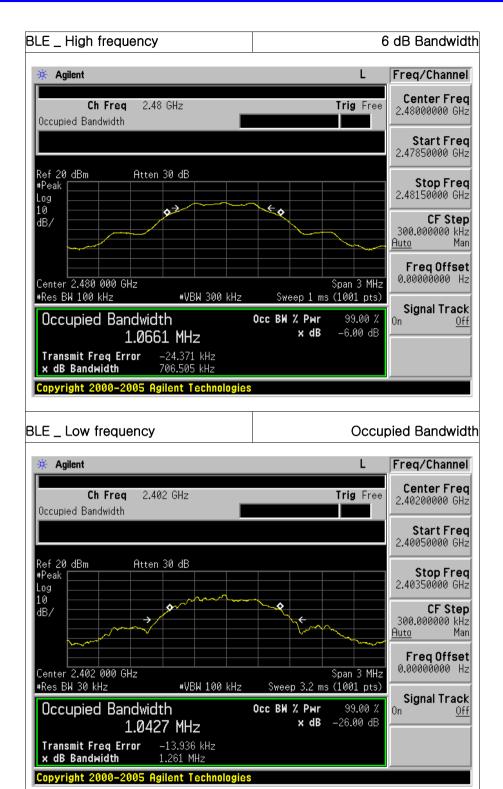


6.5 Test Plot



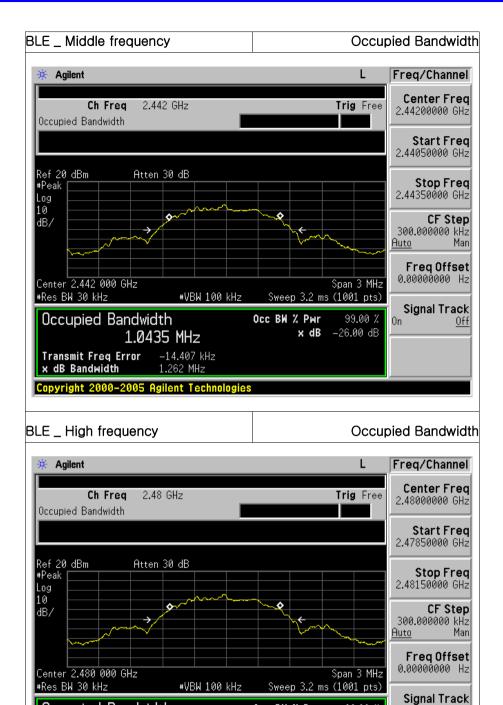
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Occupied Bandwidth

Transmit Freq Error x dB Bandwidth

Copyright 20

1.0403 MHz

–15.186 kHz

1.260 MHz

Agilent Techni

Occ BW % Pwr

x dB

99.00 %

-26.00 dB

0n

<u>0ff</u>



7. Maximum Peak Output Power

7.1 Test Setup

Refer to the APPENDIX I.

7.2 Limit

The maximum permissible conducted output power is 1 Watt.

7.3 Test Procedure

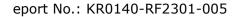
A transmitter antenna terminal of EUT is connected to the input of a spectrum analyzer. Measurement is made while the EUT is operating in transmission mode at the appropriate frequencies.

- 1. Set the RBW \geq DTS bandwidth
- 2. Set VBW \geq 3 x RBW
- 3. Set span \geq 3 x RBW.
- 4. Sweep time = auto couple
- 5. Detector = peak
- 6. Trace mode = max hold
- 7. Allow trace to fully stabilize
- 8. Use peak search function to determine the peak amplitude level.

7.4 Test Result

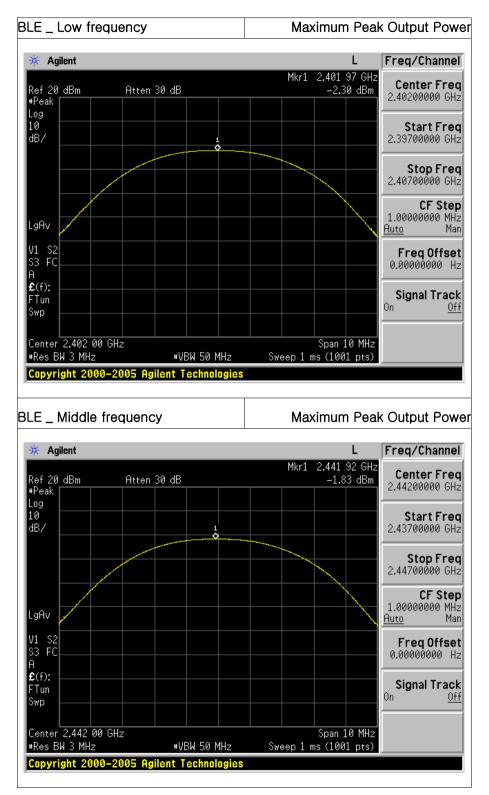
Test Mode	Test Frequency	Peak Out	out Power
Test Mode	Test Frequency	dBm	mW
	Low	-2.30	0.59
BLE	Middle	-1.83	0.66
	High	-1.82	0.66

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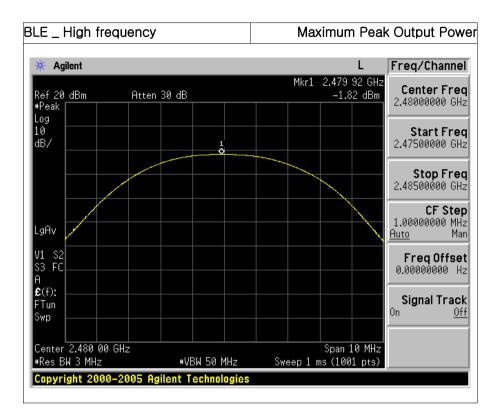


7.5 Test Plot



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8. Peak Power Spectral Density

8.1 Test Setup

Refer to the APPENDIX I.

8.2 Limit

The power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission

8.3 Test Procedure

The peak power density is measured with a spectrum analyzer connected to the antenna terminal while the EUT is operating in transmission mode at the appropriate frequencies.

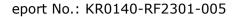
(ANSI C63.10-2013 _ Section 11.10.2 - Method PKPSD)

- 1. Set analyzer center frequency to DTS channel center frequency.
- 2. Set the span to 1.5 times the DTS bandwidth.
- 3. Set the RBW : 3 kHz \leq RBW \leq 100 kHz.
- 4. Set the VBW \geq 3 x RBW.
- 5. Detector = Peak.
- 6. Sweep time = Auto
- 7. Trace mode = Max Hold.
- 8. Allow trace to fully stabilize.
- 9. Use the peak marker function to determine the maximum amplitude level within the RBW.
- 10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

Test Mode	Test Frequency	Peak Power Spectral Density (dBm)
	Low	-17.22
BLE	Middle	-16.84
	High	-16.90

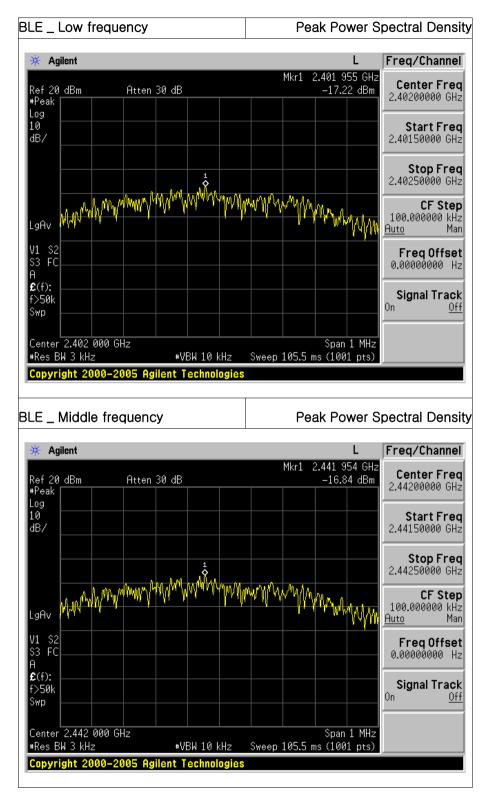
8.4 Test Result

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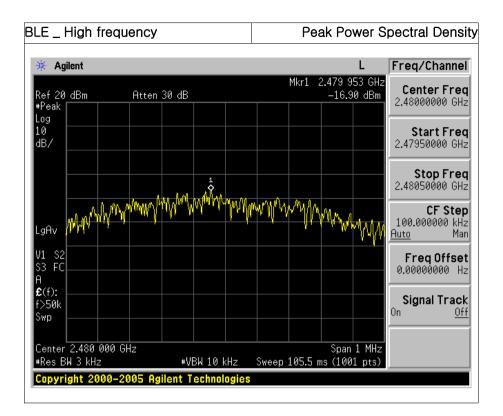


8.5 Test Plot



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9. TX Radiated Spurious Emission and Conducted Spurious Emission

9.1 Test Setup

Refer to the APPENDIX I.

9.2 Limit

According to §15.247(d), in any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated 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, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph(b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in section §15.209(a) is not required. In addition, radiated emission which in the restricted band, as define in section §15.205(a), must also comply the radiated emission limits specified in section §15.209(a) (see section §15.205(c))

According to § 15.209(a), except as provided elsewhere in this Subpart, the emissions from an intentional

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Frequency (MHz)	Limit (uV/m)	Measurement Distance (meter)
0.009 ~ 0.490	2400/F (kHz)	300
0.490 ~ 1705	24000/F (kHz)	30
1705 ~ 30.0	30	30
30 ~ 88	100 **	3
88 ~ 216	150 **	3
216 ~ 960	200 **	3
Above 960	500	3

radiator shall not exceed the field strength levels specified in the following table

** Except as provided in 15.209(g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54 - 72 MHz, 76 - 88 MHz, 174 - 216 MHz or 470 - 806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g. 15.231 and 15.241.



According to § 15.205(a) and (b), only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.009 ~ 0.110	16.42 ~ 16.423	399.90 ~ 410	4.5 ~ 5.15
0.495 ~ 0.505	16.69475 ~ 16.69525	608 ~ 614	5.35 ~ 5.46
2.1735 ~ 2.1905	16.80425 ~ 16.80475	960 ~ 1240	7.25 ~ 7.75
4.125 ~ 4.128	25.5 ~ 25.67	1300 ~ 1427	8.025 ~ 8.5
4.17725 ~ 4.17775	37.5 ~ 38.	1435 ~ 1626.5	9.0 ~ 9.2
4.20725 ~ 4.20775	25 73 ~ 74.6	1645.5 ~ 1646.5	9.3 ~ 9.5
4.17725 ~ 4.17775	74.8 ~ 75.2	1660 ~ 1710	10.6 ~ 12.7
6.215 ~ 6.218	108 ~ 121.94	1718.8 ~ 1722.2	13.25 ~ 13.4
6.26775 ~ 6.26825	149.9 ~ 150.05	2200 ~ 2300	14.47 ~ 14.5
6.31175 ~ 6.31225	156.52475 ~ 156.52525	2310 ~ 2390	15.35 ~ 16.2
8.291 ~ 8.294	156.7 ~ 156.9	2483.5 ~ 2500	17.7 ~ 21.4
8.362 ~ 8.366	162.0125 ~ 167.17	2690 ~ 2900	22.01 ~ 23.12
8.37625 ~ 8.38675	3345.8 ~ 3358	3260 ~ 3267	23.6 ~ 24.0
8.41425 ~ 8.41475	3600 ~ 4400	3332 ~ 3339	31.2 ~ 31.8
12.51975 ~ 12.52025	3345.8 ~ 3358	240 ~ 285	36.43 ~ 36.5
12.57675 ~ 12.57725	3600 ~ 4400	322 ~ 335.4	Above 38.6
13.36 ~ 13.41			

The field strength of emissions appearing within these frequency bands shall not exceed the limits shown in §15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in §15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in §15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in §15.35 apply to these measurements.



9.3 Test Procedure for Radiated Spurious Emission

- 1. The EUT is placed on a non-conductive table. For emission measurements at or below 1 GHz, the table height is 80 cm. For emission measurements above 1 GHz, the table height is 1.5 m. The table was rotated 360 degrees to determine the position of the highest radiation.
- 2. During performing radiated emission below 1 GHz, the EUT was set 3 meters away from the interference receiving antenna, which was mounted on the top of a variable-height antenna tower. During performing radiated emission above 1 GHz, the EUT was set 3.75 meter away from the interference-receiving antenna.
- 3. For measurements above 1 GHz absorbers are placed on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections. For measurements below 1 GHz, the absorbers are removed.
- 4. The antenna is a Broadband antenna, and its 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 and the table was turned from 0 degrees to 360 degrees to find the maximum reading. (The EUT was pre-tested with three axes (X, Y, Z) and the final test was performed at the worst case.)
- 6. Repeat above procedures until the measurements for all frequencies are complete.

Measurement Instrument Setting

- 1. Frequency Range: Below 1 GHz RBW = 100 or 120 kHz, VBW = 3 x RBW, Detector = Peak or Quasi Peak
- 2. Frequency Range: Above 1 GHz

```
Peak Measurement
RBW = 1 MHz, VBW = 3 MHz, Detector = Peak, Sweep time = Auto,
Trace mode = Max Hold until the trace stabilizes
```

Average Measurement RBW = 1 MHz, VBW = 3 MHz, Detector = RMS (Number of points ≥ 2 x Span / RBW), Trace Mode = Average (Averaging type = power(i.e. RMS)), Sweep Time = Auto, Sweep Count = at least 100 traces

A correction factor shall be added to the measurement results prior to comparing to the emission limit in order to compute the emission level that would have been measured had the test been performed at 100 percent duty cycle. The correction factor is computed as follows:

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- 1) If power averaging (RMS) mode was used in step 4, then the applicable correction factor is 10 log(1/x), where x is the duty cycle.
- 2) If linear voltage averaging mode was used in step 4, then the applicable correction factor is 20 log(1/x), where x is the duty cycle.
- If a specific emission is demonstrated to be continuous (≥ 98 percent duty cycle) rather than tuning on and off with the transmit cycle, then no duty cycle correction is required for that emission.

9.4 Test Procedure for Conducted Spurious Emission

- 1. The transmitter output was connected to the spectrum analyzer.
- 2. The reference level of the fundamental frequency was measured with the spectrum analyzer using RBW = 100 kHz, VBW = 300 kHz.
- 3. The conducted spurious emission was tested each ranges were set as below. Frequency range: 30 MHz ~ 26.5 GHz
 RBW = 100 kHz, VBW = 300 kHz, Sweep Time = Auto, Detector = Peak, Trace = Max Hold

LIMIT LINE = 20 dB below of the reference level of above measurement procedure Step 2. (RBW = 100 kHz, VBW = 300 kHz)



9.5 Test Result

9 kHz \sim 25 GHz Data for BLE

• Low frequency

Frequency	Rea	ding		.	0.05	Lin	nits	Re	sult	Ма	rgin
Fiequency	(dBu	V/m)	Pol.	T.F (dB)	DCF (dB)	(dBu	V/m)	(dBu	ıV/m)	(d	в)
(MHz)	AV ,	/ Peak		(48)	(00)	AV /	Peak	AV /	Peak	AV /	Peak
2 389.56	16.25	28.82	Н	13.78	2.07	54.0	74.0	32.1	42.6	21.9	31.4
3 602.45	43.72	49.26	Н	2.87	2.07	54.0	74.0	48.7	52.1	5.3	21.9
4 804.40	29.80	39.06	Н	6.24	2.07	54.0	74.0	38.1	45.3	15.9	28.7

• Middle frequency

Fraguanay	Rea	ding		- -	0.05	Lin	nits	Re	sult	Ma	rgin
Frequency	(dBu	V/m)	Pol.	T.F (dB)	DCF (dB)	(dBu	V/m)	(dBu	IV/m)	(d	в)
(MHz)	AV /	/ Peak		(40)	(00)	AV /	Peak	AV /	Peak	AV /	Peak
3 663.06	42.27	48.05	Н	0.79	2.07	54.0	74.0	45.1	48.8	8.9	25.2
4 883.60	30.41	38.72	Н	5.98	2.07	54.0	74.0	38.5	44.7	15.5	29.3

• High frequency

Fraguanay	Rea	ding				Lin	nits	Re	sult	Ма	rgin
Frequency	(dBu	V/m)	Pol.	T.F (dB)	DCF (dB)	(dBu	IV/m)	(dBu	IV/m)	(d	в)
(MHz)	AV /	/ Peak		(00)	(00)	AV /	Peak	AV /	Peak	AV /	Peak
2 484.22	21.46	33.90	Н	14.15	2.07	54.0	74.0	37.7	48.1	16.3	26.0
3 720.35	40.72	46.99	Н	0.24	2.07	54.0	74.0	43.0	47.2	11.0	26.8
4 959.94	24.75	35.88	Н	6.15	2.07	54.0	74.0	33.0	42.0	21.0	32.0

Note 1: The radiated emissions were investigated 9 kHz to 25 GHz. And no other spurious and harmonic emissions were found above listed frequencies.

Note 2: DCF(Duty Cycle Factor)

- T_{on} = 0.387 ms / T_{off} = 0.237 ms

- Duty Cycle = T_{on} / (T_{on}+T_{off}) = 0.387 / (0.387+0.237) = 0.620

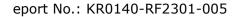
- DCF = $10 \times \log(1/\text{Duty Cycle}) \text{ dB} = 10 \times \log(1/0.620) \text{ dB} = 2.07 \text{ dB}$

Note 3: Sample Calculation.

Margin = Limit - Result / Peak Result = Peak Reading + TF / Average Result = Average Reading + TF + DCF

TF = Ant factor + Cable Loss + Filter Loss - Amp Gain + Distance Factor

Distance Factor = 20log(applied distance/required distance) = 20log(3.75m/3m) = 1.94





9.6 Test Plot for Radiated Spurious Emission

• BLE _ Low frequency

						•	10001100	ed Ban	
MultiView 🕀	Spectrum	Spectrur	n 2 🕱	Spectrum 3	X Spectru	um 4 🕱			▽
Ref Level 87 Att	7.00 dBµV	● RBW 1.01 ms ● VBW	/ 1 MHz	e Auto Sweep			Fr	equency 2.3	500000 GHz
Input 1 Frequency S	1 AC PS	On Note	sh Off						●1Pk Max
80 dBµV							N	1[1]	28.82 dBµV 2.3895604 GHz
00 0000									
70 dBµV									
60 dBµV									
50 dBµV									
40 dBµV									
									MI
30 dBµV	14 Maryoundura	الم من مان	and and the state of the	a un soldente d		marked marked	and the second	ununum	an an and
20 dBµV	te conferration and a	in all many and the first for the	alasalan seria di	odi, fa sta tra na.		- Pollo de Calo IV-			
10 -00-01									
10 dΒμV									
0 dBµV									
-10 dBµV									
2.31 GHz			1001 pt	s	8	.0 MHz/			2.39 GHz
						Res	tricted	Band -	Averag
MultiView 🗄	Spectrum	X Spectrum	n 2 🕱	Spectrum 3	X Spectru		tricted	Band -	Average
Ref Level 87 Att	7.00 dBµV 0 dB SWT	● RBW 1.01 ms ● VBW	/ 1 MHz / 3 MHz Mod		SGL Count 100/100	um 4 🛛 🕱			
Ref Level 87	7.00 dBµV 0 dB SWT 1 AC PS	● RBW	/ 1 MHz / 3 MHz Mod		SGL	um 4 🛛 🕱		equency 2.3	▼ 500000 GHz ●1Rm Avg
Ref Level 87 Att Input	7.00 dBµV 0 dB SWT 1 AC PS	● RBW 1.01 ms ● VBW	/ 1 MHz / 3 MHz Mod		SGL	um 4 🛛 🕱		equency 2.3	▼ 500000 GHz ●1Rm Avg
Ref Level 87 Att Input I Frequency S	7.00 dBµV 0 dB SWT 1 AC PS	● RBW 1.01 ms ● VBW	/ 1 MHz / 3 MHz Mod		SGL	um 4 🛛 🕱		equency 2.3	▼ 500000 GHz 18m Avg 16.25 dBµV
Ref Level 87 Att Input I Frequency S	7.00 dBµV 0 dB SWT 1 AC PS	● RBW 1.01 ms ● VBW	/ 1 MHz / 3 MHz Mod		SGL	um 4 🛛 🕱		equency 2.3	▼ 500000 GHz 18m Avg 16.25 dBµV
Ref Level 87 Att Input 1 Frequency 9 80 dBµV	7.00 dBµV 0 dB SWT 1 AC PS	● RBW 1.01 ms ● VBW	/ 1 MHz / 3 MHz Mod		SGL	um 4 🛛 🕱		equency 2.3	▼ 500000 GHz 18m Avg 16.25 dBµV
Ref Level 87 Att Input 1 Frequency 9 80 dBµV 70 dBµV 60 dBµV	7.00 dBµV 0 dB SWT 1 AC PS	● RBW 1.01 ms ● VBW	/ 1 MHz / 3 MHz Mod		SGL	um 4 🛛 🕱		equency 2.3	▼ 500000 GHz 18m Avg 16.25 dBµV
Ref Level 87 ● Att Input 1 Frequency \$ 80 d8µV	7.00 dBµV 0 dB SWT 1 AC PS	● RBW 1.01 ms ● VBW	/ 1 MHz / 3 MHz Mod		SGL	um 4 🛛 🕱		equency 2.3	▼ 500000 GHz 18m Avg 16.25 dBµV
Ref Level 87 ● Att Input 1 Frequency 9 80 dBµV 70 dBµV 60 dBµV	7.00 dBµV 0 dB SWT 1 AC PS	● RBW 1.01 ms ● VBW	/ 1 MHz / 3 MHz Mod		SGL	um 4 🛛 🕱		equency 2.3	▼ 500000 GHz 18m Avg 16.25 dBµV
Ref Level 87 Att Input Input 1 Frequency 80 dBµ/ 70 dBµ/ 60 dBµ/ 50 dBµ/ 40 dBµ/	7.00 dBµV 0 dB SWT 1 AC PS	● RBW 1.01 ms ● VBW	/ 1 MHz / 3 MHz Mod		SGL	um 4 🛛 🕱		equency 2.3	▼ 500000 GHz 18m Avg 16.25 dBµV
Ref Level 87 • Att Input 1 1 80 4 70 4 50 4 50 50 4 50 4 50 4 50 50 50	7.00 dBµV 0 dB SWT 1 AC PS	● RBW 1.01 ms ● VBW	/ 1 MHz / 3 MHz Mod		SGL	um 4 🛛 🕱		equency 2.3	▼ 500000 GHz 18m Avg 16.25 dBµV
Ref Level 87 Att Input Input 1 Frequency 80 dBµ/ 70 dBµ/ 60 dBµ/ 50 dBµ/ 40 dBµ/	7.00 dBµV 0 dB SWT 1 AC PS	● RBW 1.01 ms ● VBW	/ 1 MHz / 3 MHz Mod		SGL	um 4 🛛 🕱		equency 2.3	Σ 500000 GHz 1Rm Avg 16.25 dBµV
Ref Level 87 Att Input Input S0 dBµV 70 dBµV 60 dBµV 50 dBµV 40 dBµV 30 dBµV	7.00 dBµV 0 dB SWT 1 AC PS	● RBW 1.01 ms ● VBW	/ 1 MHz / 3 MHz Mod		SGL	um 4 🛛 🕱		equency 2.3	▼ 500000 GHz 18m Avg 16.25 dBµV
Ref Level 87 Att Input Input IPrequency 80 dBµ/ 70 dBµ/ 60 dBµ/ 50 dBµ/ 40 dBµ/ 30 dBµ/ 20 dBµ/	7.00 dBµV 0 dB SWT 1 AC PS	● RBW 1.01 ms ● VBW	/ 1 MHz / 3 MHz Mod		SGL	um 4 🛛 🕱		equency 2.3	Σ 500000 GHz 1Rm Avg 16.25 dBµV
Ref Level 87 Att Input Input IPrequency 80 dBµ/ 70 dBµ/ 60 dBµ/ 50 dBµ/ 40 dBµ/ 30 dBµ/ 20 dBµ/	7.00 dBµV 0 dB SWT 1 AC PS	● RBW 1.01 ms ● VBW	/ 1 MHz / 3 MHz Mod		SGL	um 4 🛛 🕱		equency 2.3	Σ 500000 GHz 1Rm Avg 16.25 dBµV
Ref Level 87 Att Input Input Input IFrequency 80 dBµ/ 70 dBµ/ 60 dBµ/ 50 dBµ/ 40 dBµ/ 30 dBµ/ 20 dBµ/ 10 dBµ/	7.00 dBµV 0 dB SWT 1 AC PS	● RBW 1.01 ms ● VBW	/ 1 MHz / 3 MHz Mod		SGL	um 4 🛛 🕱		equency 2.3	●1Rm Avg 16.25 dBµV

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MultiView	Spectrum	x Sp	ectrum 2	X Spectr	rum 3 🛛 🛛				▽
Ref Level 80. Att Input	0 dB SWT	● RB₩ 1.01 ms ● VB₩ Off Note	/ 1 MHz / 3 MHz Mode	Auto Sweep			Fre	equency 3.60	030000 GHz
l Frequency S		011 1000						M1[1]	 1Pk Max 49.26 dBμV
70 dBµV								3	60245100 GHz
50 dBµV									
50 dBµV				M1					
Ю dBµV	Markalanan	م منعطية الم	LWW MAN AND AND AND AND AND AND AND AND AND A			- Andrew -	halland and the	horme - secold by Aske	houderloom
30 dBµV								and holdered to	
20 dBµV									
10 dBµV									
0 dBµV									
-10 dBµV									
F 3.603 GHz			1001 pt	S	1	.0 MHz/			Span 10.0 MHz
							Spu	irious –	Averag
						5	Spu	irious –	Averag
Ref Level 80.	.00 dBµV	⊖ RB₩	ectrum 2		GL				
Ref Level 80. Att Input	00 dBµV 0 dB SWT 1 AC PS	⊖ RB₩	/ 1 MHz / 3 MHz Mode	;	GL				
Ref Level 80. Att Input	00 dBµV 0 dB SWT 1 AC PS	● RBW 1.01 ms ● VBW	/ 1 MHz / 3 MHz Mode	;	GL			equency 3.60	⊽ 030000 GHz
Ref Level 80. Att Input Frequency S	00 dBµV 0 dB SWT 1 AC PS	● RBW 1.01 ms ● VBW	/ 1 MHz / 3 MHz Mode	;	GL			equency 3.60	▼ 030000 GHz • 1Rm Avg 43.72 dBµV
Ref Level 80. Att Input Frequency S	00 dBµV 0 dB SWT 1 AC PS	● RBW 1.01 ms ● VBW	/ 1 MHz / 3 MHz Mode	;	GL			equency 3.60	▼ 030000 GHz • 1Rm Avg 43.72 dBµV
Ref Level 80. Att Input Frequency S 70 dBµV	00 dBµV 0 dB SWT 1 AC PS	● RBW 1.01 ms ● VBW	/ 1 MHz / 3 MHz Mode	;	GL			equency 3.60	▼ 030000 GHz • 1Rm Avg 43.72 dBµV
Ref Level 80.0 Att Input IFrequency S 70 d8μν 50 d8μν 50 d8μν	00 dBµV 0 dB SWT 1 AC PS	● RBW 1.01 ms ● VBW	/ 1 MHz / 3 MHz Mode	;	GL			equency 3.60	▼ 030000 GHz • 1Rm Avg 43.72 dBµV
Ref Level 80.0 Att Input IFrequency S 70 d8μν 50 d8μν 50 d8μν	00 dBµV 0 dB SWT 1 AC PS	● RBW 1.01 ms ● VBW	/ 1 MHz / 3 MHz Mode	Auto Sweep	GL			equency 3.60	▼ 030000 GHz • 1Rm Avg 43.72 dBµV
Ref Level S0.1 Att Input IFrequency S 60 dbµV 50 dbµV 40 dbµV	00 dBµV 0 dB SWT 1 AC PS	● RBW 1.01 ms ● VBW	/ 1 MHz / 3 MHz Mode	Auto Sweep	GL			equency 3.60	▼ 030000 GHz • 1Rm Avg 43.72 dBµV
Ref Level S0.1 Att Input Input Frequency S 60 dbµv 50 dbµv 40 dbµv 30 dbµv	00 dBµV 0 dB SWT 1 AC PS	● RBW 1.01 ms ● VBW	/ 1 MHz / 3 MHz Mode	Auto Sweep	GL			equency 3.60	Σ 030000 GHz 1Rm Avg 43.72 dBμV
Ref Level S0.1 Att Input Input 50 dbµv 50 dbµv 40 dbµv 30 dbµv 30 dbµv 20 dbµv	00 dBµV 0 dB SWT 1 AC PS	● RBW 1.01 ms ● VBW	/ 1 MHz / 3 MHz Mode	Auto Sweep	GL			equency 3.60	▼ 030000 GHz • 1Rm Avg 43.72 dBµV
Ref Level S0.1 Att Input Input 50 dbµv 50 dbµv 40 dbµv 30 dbµv 30 dbµv 20 dbµv 41 dbµv 32 dbµv 33 dbµv 34 dbµv 35 dbµv 36 dbµv 37 dbµv 38 dbµv 39 dbµv 30 dbµv 30 dbµv 30 dbµv	00 dBµV 0 dB SWT 1 AC PS	● RBW 1.01 ms ● VBW	/ 1 MHz / 3 MHz Mode	Auto Sweep	GL			equency 3.60	▼ 030000 GHz • 1Rm Avg 43.72 dBµV
Att	00 dBµV 0 dB SWT 1 AC PS	● RBW 1.01 ms ● VBW	/ 1 MHz / 3 MHz Mode	Auto Sweep	GL			equency 3.60	Σ 030000 GHz 1Rm Avg 43.72 dBμV
Ref Level S0.1 Att Input Input 50 dbµv 50 dbµv 40 dbµv 30 dbµv 30 dbµv 20 dbµv 41 dbµv 32 dbµv 33 dbµv 34 dbµv 35 dbµv 36 dbµv 37 dbµv 38 dbµv 39 dbµv 30 dbµv 30 dbµv 30 dbµv	00 dBµV 0 dB SWT 1 AC PS	● RBW 1.01 ms ● VBW	/ 1 MHz / 3 MHz Mode	Auto Sweep	GL			equency 3.60	▼ 030000 GHz • 1Rm Avg 43.72 dBµV
Ref Level \$0.1 Att Input Frequency S 10 dbµv	OD dBµV O dB SWT I AC PS WCCP	● RBW 1.01 ms ● VBW	/ 1 MHz / 3 MHz Mode	Auto Sweep	SGL			equency 3.60	030000 GHz • 1Rm Avg 43.72 dBµV

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								Spuriou	is – Pea
MultiView	Spectrum	x Sp	pectrum 2	X Spect	rum 3 🛛 🛛				▽
Ref Level 80.0 Att Input	00 dBµV 0 dB SWT 1 AC PS	● RBV 1.01 ms ● VBV Off Not	NY 1 MHz NY 3 MHz Mode	Auto Sweep			Fr	equency 4.8	040000 GHz
I Frequency S		011 1400						M1[1]	1Pk Max 39.06 dBµV
70 dBµV								4	80440000 GHz
i0 dBµV									
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maderelan	mmunul	monthe		and a second second		monevere	manum	and the second	Mugunante
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F 4.804 GHz			1001 pt	s		.0 MHz/			Span 10.0 MHz
							Sni		
Multi\/iew	Spectrum	T SI	pectrum 2			7	Spi		
Ref Level 80.0 Att	00 dBµV 0 dB SWT	● RBV 1.01 ms ● VBV	V 3 MHz Mode	Spect	rum 3 sgL			irious –	Averag
Ref Level 80.0 Att Input	00 dBµV 0 dB SWT 1 AC PS	• RBV	N/ 1 MHz N/ 3 MHz Mode	Spect	rum 3 sgL			IFIOUS — equency 4.84	Averag v 040000 GH: •1Rm Avg
Ref Level 80.0 Att Input Frequency S	00 dBµV 0 dB SWT 1 AC PS	● RBV 1.01 ms ● VBV	N/ 1 MHz N/ 3 MHz Mode	Spect	rum 3 sgL			equency 4.80	Averac v 040000 GH: 1Rm Avg 29.80 dBpt
Ref Level 80.0 Att Input Frequency S	00 dBµV 0 dB SWT 1 AC PS	● RBV 1.01 ms ● VBV	N/ 1 MHz N/ 3 MHz Mode	Spect	rum 3 sgL			equency 4.80	Averac v 040000 GH 1Rm Avg 29.80 dBµ
Ref Level 80.0 Att Input Frequency S 0 d8µV	00 dBµV 0 dB SWT 1 AC PS	● RBV 1.01 ms ● VBV	N/ 1 MHz N/ 3 MHz Mode	Spect	rum 3 sgL			equency 4.80	Averac v 040000 GH: 1Rm Avg 29.80 dBpt
Ref Level 80.0 Att Input Frequency S 0 dBµV	00 dBµV 0 dB SWT 1 AC PS	● RBV 1.01 ms ● VBV	N/ 1 MHz N/ 3 MHz Mode	Spect	rum 3 sgL			equency 4.80	Averac v 040000 GH: 1Rm Avg 29.80 dBpt
Ref Level 80.0 Att Input Frequency S 0 dBµV 0 dBµV 0 dBµV 0 dBµV	00 dBµV 0 dB SWT 1 AC PS	● RBV 1.01 ms ● VBV	N/ 1 MHz N/ 3 MHz Mode	Spect	rum 3 sgL			equency 4.80	Averag v 040000 GH: 1Rm Avg 29.80 dBµV
Ref Level 80.0 Att Input Input 6 0 dBµV 0 dBµV 0 dBµV 0 dBµV 0 dBµV 0 dBµV	00 dBµV 0 dB SWT 1 AC PS	● RBV 1.01 ms ● VBV	N/ 1 MHz N/ 3 MHz Mode	X Spect	rum 3 sgL			equency 4.80	Averag
Ref Level 80.0 Att Input Input 6 0 dBµV 0 dBµV 0 dBµV 0 dBµV 0 dBµV 0 dBµV	00 dBµV 0 dB SWT 1 AC PS	● RBV 1.01 ms ● VBV	N/ 1 MHz N/ 3 MHz Mode	Spect	rum 3 sgL			equency 4.80	Averag v 040000 GH: 1Rm Avg 29.80 dBµV
Ref Level 80.0 Att Input Frequency S 0 dBµv	00 dBµV 0 dB SWT 1 AC PS	● RBV 1.01 ms ● VBV	N/ 1 MHz N/ 3 MHz Mode	X Spect	rum 3 2 SGL Count 100/100			equency 4.80	Averag v 040000 GH: 1Rm Avg 29.80 dBµV
Ref Level 80.0 Att Input Frequency S 0 dBµV	00 dBµV 0 dB SWT 1 AC PS	● RBV 1.01 ms ● VBV	N/ 1 MHz N/ 3 MHz Mode	X Spect	rum 3 2 SGL Count 100/100			equency 4.80	Averag v 040000 GH: 1Rm Avg 29.80 dBµV
Ref Level 80.1 Att Input Frequency S 0 dbµv	00 dBµV 0 dB SWT 1 AC PS	● RBV 1.01 ms ● VBV	N/ 1 MHz N/ 3 MHz Mode	X Spect	rum 3 2 SGL Count 100/100			equency 4.80	Averag v 040000 GH: 1Rm Avg 29.80 dBµV
MultiView Ref Level 80.0 Ref Level 80.0 Att Input Trequency S 0 dBµV 0 0 dBµV 0	00 dBµV 0 dB SWT 1 AC PS	● RBV 1.01 ms ● VBV	N/ 1 MHz N/ 3 MHz Mode	X Spect	rum 3 2 SGL Count 100/100			equency 4.80	Averag v 040000 GH: 1Rm Avg 29.80 dBµV
Ref Level 80.1 Att Input Frequency S 0 dbµv	00 dBµV 0 dB SWT 1 AC PS	● RBV 1.01 ms ● VBV	N/ 1 MHz N/ 3 MHz Mode	X Spect	rum 3 2 SGL Count 100/100			equency 4.80	Averag v 040000 GH: 1Rm Avg 29.80 dBµV

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• BLE _ Middle frequency

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MultiView =	Spectrum	xS	pectrum 2	X Spect	rum 3 🛛 🗴	2			_ ⊽
Ref Level 80.00 Att	0 dBull		N/1 MHz N/3 MHz Mod adh Off			1	Fr	equency 3.60	525000 GH
Input I Frequency Sw	1 AC PS veep	Off Not	ch Off					equency eres	• 1Pk Max
								M1[1] 3	48.05 dBµ' 66305900 GH
70 dBµV									
60 dBµV									
о овру									
0 dBµV					M1				
0 dBµV				and man		- Marken of			
manking	alternam marine	munuhun	marketer Jebler 194				monum	menhandra	handahalaha
0 dBµV									
0.40.41									
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) dBµV									
dBµV									
10 dBμV									
F 3.6625 GHz			1001 p	ts	1	.0 MHz/	Spi		
	·····					7	Spi	rious –	Span 10.0 MH
fultiView	С Spectrum 0 dBµV 0 dB SWT ::	● RBV 1.01 ms ● VBV	pectrum 2 ₩ 1 MHz ₩ 3 MHz Mod	X Spect	1 rum 3 SGL Count 100/100			irious –	Averag v
fultiView and the set of Level 80.00 Att Input	С Spectrum 0 dBµV 0 dB SWT : 1 AC PS	● RB\	pectrum 2 ₩ 1 MHz ₩ 3 MHz Mod	X Spect	rum 3 sgL			Irious — equency 3.66	Averag v 525000 GH
AultiView Ref Level 80.00 Att Input	С Spectrum 0 dBµV 0 dB SWT : 1 AC PS	● RBV 1.01 ms ● VBV	pectrum 2 ₩ 1 MHz ₩ 3 MHz Mod	X Spect	rum 3 sgL			equency 3.60	Averag ▼ 525000 GH 1Rm Avg 42.27 dBµ
fultiView B Ref Level 80.00 Att Input Frequency Sw	С Spectrum 0 dBµV 0 dB SWT : 1 AC PS	● RBV 1.01 ms ● VBV	pectrum 2 ₩ 1 MHz ₩ 3 MHz Mod	X Spect	rum 3 sgL			equency 3.60	Averag 525000 GH 1Rm Avg 42.27 dBµ
IultiView Ref Level 80.00 Att Input Frequency Sw 0 dBµV	С Spectrum 0 dBµV 0 dB SWT : 1 AC PS	● RBV 1.01 ms ● VBV	pectrum 2 ₩ 1 MHz ₩ 3 MHz Mod	X Spect	rum 3 sgL			equency 3.60	Averag 525000 GH 1Rm Avg 42.27 dBµ
IultiView Ref Level 80.00 tit nput Frequency Sw I dBµV	С Spectrum 0 dBµV 0 dB SWT : 1 AC PS	● RBV 1.01 ms ● VBV	pectrum 2 ₩ 1 MHz ₩ 3 MHz Mod	X Spect	rum 3 sgL			equency 3.60	Averag 525000 GH 1Rm Avg 42.27 dBµ
IultiView Ref Level 80.00 Att Input Frequency Sw 0 d8µV	С Spectrum 0 dBµV 0 dB SWT : 1 AC PS	● RBV 1.01 ms ● VBV	pectrum 2 ₩ 1 MHz ₩ 3 MHz Mod	X Spect	rum 3 SGL Count 100/100			equency 3.60	Averag ▼ 525000 GH 1Rm Avg 42.27 dBµ
fultiView Feedueed 80.00 tt transput Frequency Sw dbµv d dbµv dbµv	С Spectrum 0 dBµV 0 dB SWT : 1 AC PS	● RBV 1.01 ms ● VBV	pectrum 2 ₩ 1 MHz ₩ 3 MHz Mod	X Spect	rum 3 sgL			equency 3.60	Averag ▼ 525000 GH 1Rm Avg 42.27 dBµ
IultiView Ref Level 80.00 Att Input Frequency Sw 0 d8µV 0 d8µV	С Spectrum 0 dBµV 0 dB SWT : 1 AC PS	● RBV 1.01 ms ● VBV	pectrum 2 ₩ 1 MHz ₩ 3 MHz Mod	X Spect	rum 3 SGL Count 100/100			equency 3.60	Averag ▼ 525000 GH 1Rm Avg 42.27 dBµ
fultiView Feedueed 80.00 tt transput Frequency Sw dbµv d dbµv dbµv d dbµv dbµv	С Spectrum 0 dBµV 0 dB SWT : 1 AC PS	● RBV 1.01 ms ● VBV	pectrum 2 ₩ 1 MHz ₩ 3 MHz Mod	X Spect	rum 3 SGL Count 100/100			equency 3.60	Averag 525000 GH 1Rm Avg 42.27 dBµ
fultiView Yef Level 80.00 tt trequency Sw d вµv d вµv d вµv d вµv d вµv d вµv	С Spectrum 0 dBµV 0 dB SWT : 1 AC PS	● RBV 1.01 ms ● VBV	pectrum 2 ₩ 1 MHz ₩ 3 MHz Mod	X Spect	rum 3 SGL Count 100/100			ITIOUS — equency 3.60 	Averag 525000 GH 1Rm Avg 42.27 dBµ
1ultiView 1 Ref Level 80.00 Att Input Frequency Sw 0 dBµV	С Spectrum 0 dBµV 0 dB SWT : 1 AC PS	● RBV 1.01 ms ● VBV	pectrum 2 ₩ 1 MHz ₩ 3 MHz Mod	X Spect	rum 3 SGL Count 100/100			ITIOUS — equency 3.60 	Averag 525000 GH 1Rm Avg 42.27 dBµ
1ultiView Ref Level 80.00 Att Input Frequency Sw 0 d8µV 0 d8µV 0 d8µV 0 d8µV 0 d8µV 0 d8µV	С Spectrum 0 dBµV 0 dB SWT : 1 AC PS	● RBV 1.01 ms ● VBV	pectrum 2 ₩ 1 MHz ₩ 3 MHz Mod	X Spect	rum 3 SGL Count 100/100			ITIOUS — equency 3.60 	Averag 525000 GH 1Rm Avg 42.27 dBµ
1ultiView Ref Level 80.00 Att Input Frequency Sw 0 d8µV	С Spectrum 0 dBµV 0 dB SWT : 1 AC PS	● RBV 1.01 ms ● VBV	pectrum 2 ₩ 1 MHz ₩ 3 MHz Mod	X Spect	rum 3 SGL Count 100/100			ITIOUS — equency 3.60 	Averag 525000 GH 1Rm Avg 42.27 dBµ
AultiView Ref Level 80.00 Att Input Frequency Sw 0 d8µV	С Spectrum 0 dBµV 0 dB SWT : 1 AC PS	● RBV 1.01 ms ● VBV	pectrum 2 ₩ 1 MHz ₩ 3 MHz Mod	X Spect	rum 3 SGL Count 100/100			ITIOUS — equency 3.60 	Averag ▼ 525000 GH 1Rm Avg 42.27 dBµ
4ultiView Ref Level 80.00 Att Input Frequency Sw 0 dBµV	С Spectrum 0 dBµV 0 dB SWT : 1 AC PS	● RBV 1.01 ms ● VBV	pectrum 2 ₩ 1 MHz ₩ 3 MHz Mod	X Spect	rum 3 SGL Count 100/100			ITIOUS — equency 3.60 	Averag v
F 3.6625 GHz AultiView Ref Level 80.00 Att Input Frequency SW 0 dBµV 0 dBµV	С Spectrum 0 dBµV 0 dB SWT : 1 AC PS	● RBV 1.01 ms ● VBV	pectrum 2 ₩ 1 MHz ₩ 3 MHz Mod	X Spect	rum 3 SGL Count 100/100			ITIOUS — equency 3.60 	Averag 525000 GH • 1Rm Avg 42.27 dBµ'

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MultiView 🗄 S	pectrum 🗐	Spectrum 2	X Specti	rum 3 🛛 🛛				∇
	dB SWT 1.01 ms 🖲 VI	BW 1 MHz BW 3 MHz Mode otch Off	Auto Sweep			Fr	equency 4.8	840000 GHz
1 Frequency Swee							M1[1]	 1Pk Max 38.72 dBµV
70 dBµV		_					4	88360000 GHz
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00 08µv								
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10 dBµV								
o apha								
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			3	1	10 11127			
			3	1		Spi		
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MultiView S Ref Level 80.00 dB	µV ⊜ Ri	Spectrum 2 BW 1 MHz	Spectr	rum 3 🛛 🛛	۲ ۲		irious –	Averag
MultiView (S Ref Level 80.00 db Att 0 Input 1.	µV ● RI dB SWT 1.01 ms ● VI AC PS Off N	Spectrum 2 BW 1 MHz	Spectr	rum 3 🛛 🛛	۲ ۲		ITIOUS — equency 4.8	Averag
MultiView F S Ref Level 80.00 dB Att 0 Input 1. Frequency Swee	µV ● RI dB SWT 1.01 ms ● VI AC PS Off N	Spectrum 2 BW 1 MHz BW 3 MHz Mode	Spectr	rum 3 🛛 🛛	۲ ۲		equency 4.8	Averag 840000 GH: 1Rm Avg 30.41 dBµV
MultiView F S Ref Level 80.00 dB Att 0 Input 1. Frequency Swee	µV ● RI dB SWT 1.01 ms ● VI AC PS Off N	Spectrum 2 BW 1 MHz BW 3 MHz Mode	Spectr	rum 3 🛛 🛛	۲ ۲		equency 4.8	Averac 840000 GH: 1Rm Avg 30.41 dBµ
MultiView F S Ref Level 80.00 db Att 00 Input 1. Frequency Swee 0 dbµV	µV ● RI dB SWT 1.01 ms ● VI AC PS Off N	Spectrum 2 BW 1 MHz BW 3 MHz Mode	Spectr	rum 3 🛛 🛛	۲ ۲		equency 4.8	Averag 840000 GH: 1Rm Avg 30.41 dBµV
MultiView F S Ref Level 80.00 db Att 00 Input 1. Frequency Swee 0 dbµV- 0 dbµV-	µV ● RI dB SWT 1.01 ms ● VI AC PS Off N	Spectrum 2 BW 1 MHz BW 3 MHz Mode	Spectr	rum 3 🛛 🛛	۲ ۲		equency 4.8	Averag 840000 GH: 1Rm Avg 30.41 dBµV
MultiView F S Ref Level 80.00 db Att 0 Input 1. Fraquency Sweet 0 dbµv	µV ● RI dB SWT 1.01 ms ● VI AC PS Off N	Spectrum 2 BW 1 MHz BW 3 MHz Mode	Spectr	rum 3 🛛 🛛	۲ ۲		equency 4.8	Averag 840000 GH: 1Rm Avg 30.41 dBµV
MultiView F S Ref Level 80.00 db 0 1 Input 1 1 Frequency Sweet 0 0 10 dbµv	µV ● RI dB SWT 1.01 ms ● VI AC PS Off N	Spectrum 2 BW 1 MHz BW 3 MHz Mode	Spectr	rum 3 🛛 🛛	۲ ۲		equency 4.8	Averag 840000 GH: 1Rm Avg 30.41 dBµV
MultiView F S Ref Level 80.00 db Att 0 Input 1. Fraquency Sweet	µV ● RI dB SWT 1.01 ms ● VI AC PS Off N	Spectrum 2 BW 1 MHz BW 3 MHz Mode	X Spectro	rum 3 🛛 🛛	۲ ۲		equency 4.8	Averag 840000 GH: 1Rm Avg 30.41 dBµV
MultiView F S Ref Level 80.00 db 0 Input 1. Input 1. Frequency Sweet 0 10 dbµv 0 0 0 0 10 dbµv 0 0 0 0 0 10 dbµv 0 <td< td=""><td>µV ● RI dB SWT 1.01 ms ● VI AC PS Off N</td><td>Spectrum 2 BW 1 MHz BW 3 MHz Mode</td><td>X Spectro</td><td>rum 3 🛛 🛛</td><td>۲ ۲</td><td></td><td>equency 4.8</td><td>Averag 840000 GH: 1Rm Avg 30.41 dBµV</td></td<>	µV ● RI dB SWT 1.01 ms ● VI AC PS Off N	Spectrum 2 BW 1 MHz BW 3 MHz Mode	X Spectro	rum 3 🛛 🛛	۲ ۲		equency 4.8	Averag 840000 GH: 1Rm Avg 30.41 dBµV
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• BLE _ High frequency

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LultiView : S Ref Level 87.0	Spectrum		m 2 🕱	Spectrum 3	SGL Spectra	Res			- Averag
.4835 GHz	0 dBµV 0 dB SWT 1 AC PS	= RBV	m 2 🗶 🕅	Spectrum 3	X Spectru	Res			- Averag
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L4835 GHz	0 dBµV 0 dB SWT 1 AC PS	● RBV 1.01 ms ● VBV	m 2 🗶 🕅	Spectrum 3	SGL Spectra	Res	Fi	requency 2.4	- Averaç 917500 GH: 1Rm Avg 21.46 dBµ
.4835 GHz	0 dBµV 0 dB SWT 1 AC PS	● RBV 1.01 ms ● VBV	m 2 🗶 🕅	Spectrum 3	SGL Spectra	Res	Fi	requency 2.4	- Averaç 917500 GH: 1Rm Avg 21.46 dBµ
L4835 GHz	0 dBµV 0 dB SWT 1 AC PS	● RBV 1.01 ms ● VBV	m 2 🗶 🕅	Spectrum 3	SGL Spectra	Res	Fi	requency 2.4	- Averaç 917500 GH: 1Rm Avg 21.46 dBµ
LAB35 GHZ	0 dBµV 0 dB SWT 1 AC PS	● RBV 1.01 ms ● VBV	m 2 🗶 🕅	Spectrum 3	SGL Spectra	Res	Fi	requency 2.4	- Averag 917500 GH: 1Rm Avg 21.46 dBpA
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.4835 GHz IultiView 5 Ref Level 87.0 Att Input Frequency Sw 0 d8μV 0 0 d8μV 0 0 d8μV 0	0 dBµV 0 dB SWT 1 AC PS	● RBV 1.01 ms ● VBV	m 2 🗶 🕅	Spectrum 3	SGL Spectra	Res	Fi	requency 2.4	- Averag 917500 GH: 1Rm Avg 21.46 dBpA
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14835 GHz 14835 GHz 14111View B 8 Ref Level 87.0 Att Input Frequency Sw 0 dBµV	0 dBµV 0 dB SWT 1 AC PS	RBV 1.01 ms • VBV On Not	m 2 🗶 🕅	Spectrum 3	SGL Spectra	Res	Fi	requency 2.4	- Averaç 917500 GH: 1Rm Avg 21.46 dBµ
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MultiView 🖽 S	Spectrum	x Spe	ctrum 2	X Specti	rum 3 🛛 🛛				▽
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AultiView :: 5 Ref Level 80.00 df Att 0 Input 1 Frequency Swee	ВµV)dB SWT 1.01 (АС PS (● RBW ms ● VBW	ctrum 2 1 MHz 3 MHz Mode	Spectr	rum 3 z	7		equency 3.7	Averag ▼ 200000 GH: ●1Rm Avg 40.72 dBµV
AultiView :: 5 Ref Level 80.00 dt Att 0 Input 1 Frequency Swee 0 dbµV-	ВµV)dB SWT 1.01 (АС PS (● RBW ms ● VBW	ctrum 2 1 MHz 3 MHz Mode	Spectr	rum 3 z	7		equency 3.7	Averag ▼ 200000 GH: ●1Rm Avg 40.72 dBµV
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MultiView + S RefLevel 80.00 di Att 0 Input 1	ВµV)dB SWT 1.01 (АС PS (● RBW ms ● VBW	ctrum 2 1 MHz 3 MHz Mode	Spectr	rum 3 z	7		equency 3.7	Averag
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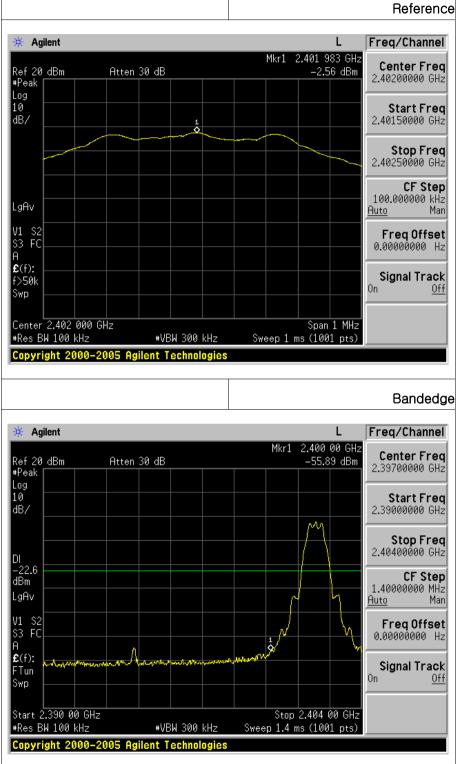
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Ref Level 80. Att Input	00 dBµV 0 dB SWT 1 AC PS	● RB 1.01 ms ● VB	epectrum 2	Spectro	rum 3 sgL			equency 4.9	Averag
Ref Level 80.0 Att Input Frequency S	00 dBµV 0 dB SWT 1 AC PS	● RB 1.01 ms ● VB	epectrum 2 W 1 MHz W 3 MHz Mod	Spectro	rum 3 sgL			equency 4.9	Averag 600000 GHz 1Rm Avg 24.75 dBµV
Ref Level 80.4 Att Input Frequency S	00 dBµV 0 dB SWT 1 AC PS	● RB 1.01 ms ● VB	epectrum 2 W 1 MHz W 3 MHz Mod	Spectro	rum 3 sgL			equency 4.9	Averag 600000 GHz 24.75 dBµV
Ref Level 80. Att Input Frequency S 10 dBμV 10 dBμV	00 dBµV 0 dB SWT 1 AC PS	● RB 1.01 ms ● VB	epectrum 2 W 1 MHz W 3 MHz Mod	Spectro	rum 3 sgL			equency 4.9	Averag 600000 GHz 24.75 dBµV
Ref Level 80.0 Att Input Frequency S 10 dBμV 50 dBμV	00 dBµV 0 dB SWT 1 AC PS	● RB 1.01 ms ● VB	epectrum 2 W 1 MHz W 3 MHz Mod	Spectro	rum 3 sgL			equency 4.9	Averag 600000 GHz 24.75 dBµV
MultiView Ref Level S0.1 Ref Level S0.1 Att Input Trequency S 70 dbµ/ 50 dbµ/ 50 dbµ/ 50 dbµ/ 40 dbµ/ 40 dbµ/	00 dBµV 0 dB SWT 1 AC PS	● RB 1.01 ms ● VB	epectrum 2 W 1 MHz W 3 MHz Mod	Spectro	rum 3 sgL			equency 4.9	Averag 600000 GHz 24.75 dBµV
Ref Level 80.1 Att Input Frequency S 70 d8μν 50 d8μν 50 d8μν	00 dBµV 0 dB SWT 1 AC PS	● RB 1.01 ms ● VB	epectrum 2 W 1 MHz W 3 MHz Mod	Spectro	rum 3 sgL			equency 4.9	Averag 600000 GHz 24.75 dBµV
Ref Level 80.1 Att Input Frequency S 60 d8µV 60 d8µV 60 d8µV 60 d8µV	00 dBµV 0 dB SWT 1 AC PS	● RB 1.01 ms ● VB	epectrum 2 W 1 MHz W 3 MHz Mod	Spectre Sympletic	rum 3 sgL			equency 4.9	Averag 600000 GHz 24.75 dBµV
Ref Level S0.1 Att Input Frequency S 00 dbµv	00 dBµV 0 dB SWT 1 AC PS	● RB 1.01 ms ● VB	epectrum 2 W 1 MHz W 3 MHz Mod	Spectre Sympletic	rum 3 sgL			equency 4.9	Averag 600000 GHz 24.75 dBµV
Ref Level 80.1 Att Input Trequency S 0 dbµv 0 dbµv	00 dBµV 0 dB SWT 1 AC PS	● RB 1.01 ms ● VB	epectrum 2 W 1 MHz W 3 MHz Mod	Spectre Sector	rum 3 sgL			equency 4.9	Averag 600000 GHz 24.75 dBµV
Ref Level \$0.1 Att Input Frequency S 10 dbµV	00 dBµV 0 dB SWT 1 AC PS	● RB 1.01 ms ● VB	epectrum 2 W 1 MHz W 3 MHz Mod	Spectre Sector	rum 3 sgL			equency 4.9	Averag 600000 GHz 24.75 dBµV
Ref Level S0.1 Att Input Frequency S 00 dbµv	00 dBµV 0 dB SWT 1 AC PS	● RB 1.01 ms ● VB	epectrum 2 W 1 MHz W 3 MHz Mod	Spectre Sector	rum 3 sgL			equency 4.9	Averag

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9.7 Test Plot for Conducted Spurious Emission

BLE _ Low frequency



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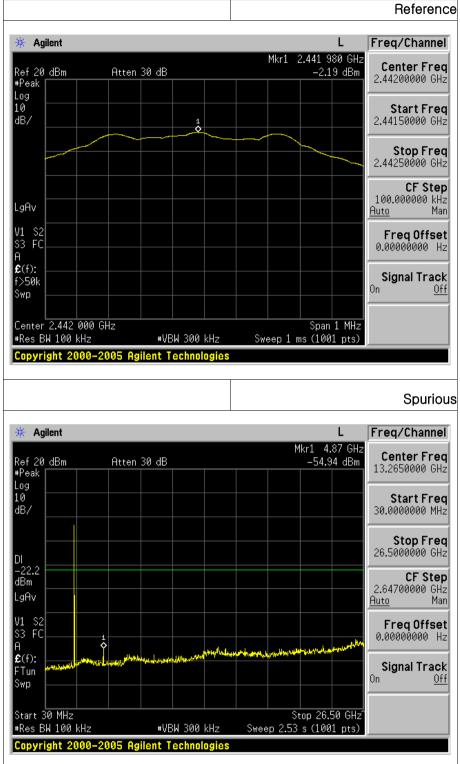


🗧 Agilent									L	Freq/Channe
ef 20 dBm ^D eak		Atten	30 dB				M		79 GHz 6 dBm	Center Fre 13.2650000 GH
og Ø 3/										Start Fre 30.0000000 MH
										Stop Fre 26.5000000 GH
22.6 3m gAv										CF Ste 2.64700000 GH <u>Auto</u> Ma
1 S2 3 FC						. در ماد	فاديار ج	hadan aya ku bara	n yunghayan	Freq Offse 0.00000000 H
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tart 30 MHz Res BW 100 k	,U-,		#UE	3W 300	↓U→	Sulea	St p 2.53		50 GHz^	

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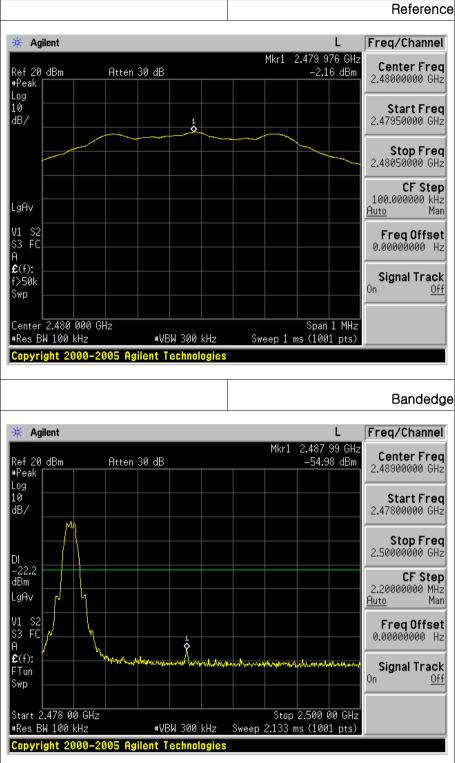
• BLE _ Middle frequency



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BLE _ High frequency



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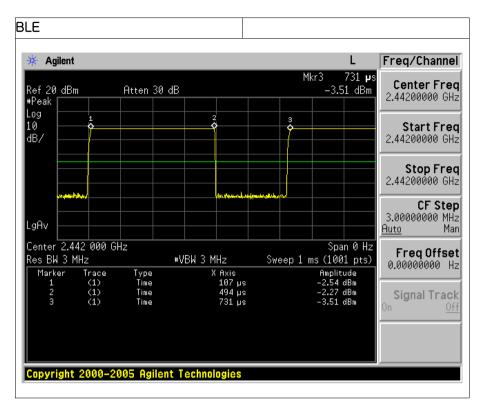


Agilent						L	Freq/Channe
ef 20 dBm Peak	Atten	30 dB			М	95 GHz 4 dBm	Center Fre 13.2650000 GH
)g) 3/							Start Fre 30.0000000 MH
22.2							Stop Fre 26.5000000 GH
3m gAv							CF Ste 2.64700000 GH <u>Auto</u> Ma
1 S2 3 FC				a classic proving		 ke yeard with fight	Freq Offse 0.00000000 H
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tart 30 MHz Res BW 100 kH			 300 kHz		St p 2.53	50 GHzî	

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9.8 Test Plot for Duty Cycle





10. Conducted Emission

10.1 Test Setup

See test photographs for the actual connections between EUT and support equipment.

10.2 Limit

According to §15.207(a) for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 uH/50 ohm line impedance stabilization network (LISN).

Compliance with the provision of this paragraph shall on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower applies at the boundary between the frequency ranges.

	Conducted 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			

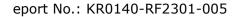
* Decreases with the logarithm of the frequency

10.3 Test Procedure

Conducted emissions from the EUT were measured according to the ANSI C63.10.

- The test procedure is performed in a 6.5 m × 3.5 m × 3.5 m (L × W × H) shielded room. The EUT along with its peripherals were placed on a 1.0 m (W) × 1.5 m (L) and 0.8 m in height wooden table and the EUT was adjusted to maintain a 0.4 meter space from a vertical reference plane.
- 2. The EUT was connected to power mains through a line impedance stabilization network (LISN) which provides 50 ohm coupling impedance for measuring instrument and the chassis ground was bounded to the horizontal ground plane of shielded room.
- 3. All peripherals were connected to the second LISN and the chassis ground also bounded to the horizontal ground plane of shielded room.
- 4. The excess power cable between the EUT and the LISN was bundled. The power cables of peripherals were unbundled. All connecting cables of EUT and peripherals were moved to find the maximum emission.

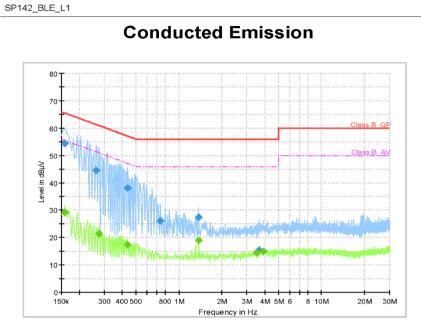
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10.4 Test Result

• AC Line Conducted Emission (Graph)

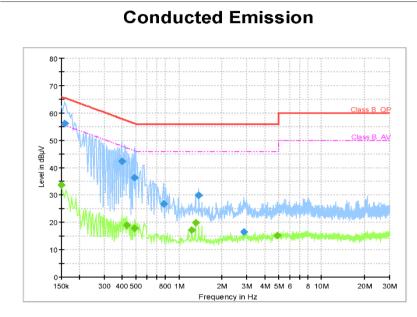


Final Result

Frequency	QuasiPeak	CAverage	Limit	Margin	Bandwidth	Line	Corr.
(MHz)	(dBµV)	(dBµV)	(dBµV)	(dB)	(kHz)		(dB)
0.158		29.18	55.57	26.39	9	L1	19.8
0.158	54.37		65.57	11.20	9	L1	19.8
0.262	44.63		61.37	16.74	9	L1	19.5
0.274		21.37	51.00	29.62	9	L1	19.6
0.438		17.34	47.10	29.76	9	L1	19.8
0.438	38.00		57.10	19.10	9	L1	19.8
0.740	26.03		56.00	29.97	9	L1	19.8
1.380		18.97	46.00	27.03	9	L1	19.7
1.380	27.40		56.00	28.60	9	L1	19.7
3.480		14.42	46.00	31.58	9	L1	19.7
3.660	15.43		56.00	40.57	9	L1	19.7
3.920		14.84	46.00	31.16	9	L1	19.7

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SP142_BLE_N

Final Result

I IIIai_ites							
Frequency	QuasiPeak	CAverage	Limit	Margin	Bandwidth	Line	Corr.
(MHz)	(dBµV)	(dBµV)	(dBµV)	(dB)	(kHz)		(dB)
0.150		33.58	56.00	22.42	9	N	19.7
0.158	56.21		65.57	9.35	9	N	19.8
0.398	42.27		57.90	15.62	9	N	19.8
0.430		18.96	47.25	28.30	9	N	19.8
0.490		17.85	46.17	28.31	9	N	19.7
0.490	36.26		56.17	19.91	9	N	19.7
0.780	26.66		56.00	29.34	9	N	19.7
1.230		17.22	46.00	28.78	9	N	19.7
1.310		19.90	46.00	26.10	9	N	19.7
1.380	29.84		56.00	26.16	9	N	19.7
2.850	16.58		56.00	39.42	9	N	19.7
4.900		15.11	46.00	30.89	9	N	19.7

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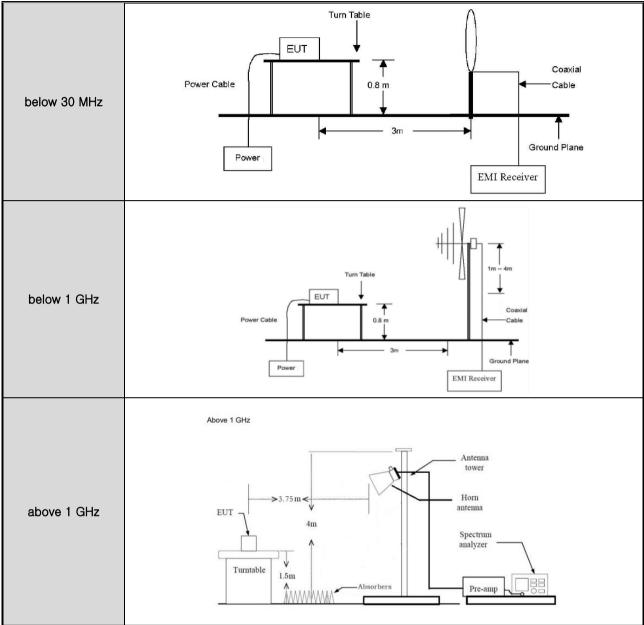
APPENDIX I

TEST SETUP

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Radiated Measurement



• Conducted Measurement

Conducted	EUT	Attenuator	Spectrum Analyzer

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APPENDIX II

UNCERTAINTY

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Measurement Item	Expanded Uncertainty U = <i>k</i> Uc (<i>k</i> =2)
Conducted RF power	0.32 dB
Conducted Spurious Emissions	0.32 dB
Radiated Spurious Emissions	6.34 dB
Conducted Emissions	1.74 dB