

Test Report				
1. Client				
<ul> <li>Name :</li> <li>Address :</li> </ul>	SENA TECHNOLOGIES.Inc 19, Heolleung-ro 569-gil, Gangnam-gu, Seoul, Korea			
2. Use of Report :	FCC & IC Approval			
3. Sample Description				
Product Name :     Model Name :	HelmLink SP124			
4. Date of Receipt :	2022-07-01			
5. Date of Test :	2022-09-08 ~ 2022-09-22			
6. Test Method :	FCC Part 15 Subpart C 15.247 RSS-247 Issue 2(2017-02), RSS-GEN Issue 5(2019-03)			
7. Test Results :	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.				
Affirmation Dae-See	by Technical Manager (signature) Yong-Min, Won			

Sep 26, 2022

EMC Labs Co., Ltd.



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# <u>Version</u>

TEST REPORT NO.	DATE	DESCRIPTION
KR0140-RF2209-016	Sep 26, 2022	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	
Contact Person	Seunghyun Kim
Telephone No.	+82-2-573-7772
Fax No.	+82-2-573-7710
E-mail	shkim@sena.com

## 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.
Applicant Address	100, Jangjateo-ro, Hobeop-myeon, Icheon-si, Gyeonggi-do, Republic of
Applicant Address	Korea
Contact Person	Yongmin Won
Telephone No.	+82-2-508-7778
Fax No.	+82-2-538-3668
FCC Designation No.	KR0140
FCC Registration No.	58000
IC Site Registration No.	28751



# 2. Equipment under Test(EUT) Information

## 2.1 General Information

Product Name	HelmLink
Model Name	SP124
FCC ID	S7A-SP124
IC	8154A-SP124
Power Supply	DC 3.8 V

#### 2.2 Additional Information

Operating Frequency	2 402 MHz ~ 2 480 MHz	
Number of channel	40	
Modulation Type	GFSK	
Antenna Type	PCB Pattern Antenna	
Antenna Gain 0.68 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	12	

#### 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	
$\square$	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		С	
$\square$	15.247(e)	RSS-247 (5.2)	Peak Power Spectral Density		С	
$\square$	15.247(d)	RSS-247 (5.5)	Conducted Spurious Emission		С	
$\square$	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	
Note 1: 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	2022.12.17
CONTROLLER	AMWON TECHNOLOGY	TEMI2500	S7800VK191 0707	2022.12.17
PSA SERIES SPECTRUM ANALYZER	AGILENT	E4440A	MY45304057	2022.12.15
MXG ANALOG SIGNAL GENERATOR	AGILENT	N5183A	MY50141890	2022.12.15
SYSTEM DC POWER SUPPLY	AGILENT	6674A	MY53000118	2022.12.15
VECTOR SIGNAL GENERATOR	ROHDE & SCHWARZ	SMBV100A	257524	2022.12.15
BLUETOOTH TESTER	TESCOM	TC-3000A	3000A480088	2022.12.15
DIRECTIONAL COUPLER	AGILENT	773D	2839A01855	2022.12.15
ATTENUATOR	AGILENT	8493C	73193	2022.12.15
ATTENUATOR	ACE RF COMM	ATT SMA 20W 20dB 8GHz	A-0820.SM20.2	2023.04.11
TERMINATIOM	HEWLETT PACKARD	909D	07492	2022.12.15
POWER DIVIDER	HEWLETT PACKARD	11636A	06916	2022.12.15
SLIDE-AC	DAEKWANG TECH	SV-1023	_	_
DIGITAL MULTIMETER	HUMANTECHSTORE	15B+	50561541WS	2022.12.15
ACTIVE LOOP ANTENNA	TESEQ	HLA 6121	55685	2022.12.30
Biconilog ANT	Schwarzbeck	VULB 9160	3260	2023.02.03
Biconilog ANT	Schwarzbeck	VULB9168	902	2023.01.14
Horn Ant.	Schwarzbeck	BBHA9120D	974	2023.01.08
Horn Ant.	S/B	BBHA9120D	1497	2023.01.25
Amplifier	TESTEK	TK-PA18H	200104-L	2023.03.17
EMI TEST RECEIVER	ROHDE& SCHWARZ	ESW44	101952	2023.04.07
PROGRAMMABLE DC POWER SUPPLY	ODA	OPE-305Q	oda-01-09-23-1831	2023.01.10
DC POWER SUPPLY	AGILENT	E3634A	MY40012120	2023.02.03
POWER SENSOR	AGILENT	U2001H	MY51140028	2023.02.19
Test Receiver	ROHDE & SCHWARZ	ESR7	101616	2023.06.28
LISN	ROHDE & SCHWARZ	ENV216	100409	2023.01.10
PULSE LIMITER	lignex1	EPL-30	NONE	2023.01.24

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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 PCB Pattern Antenna. The directional peak gain of the antenna is 0.68 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.

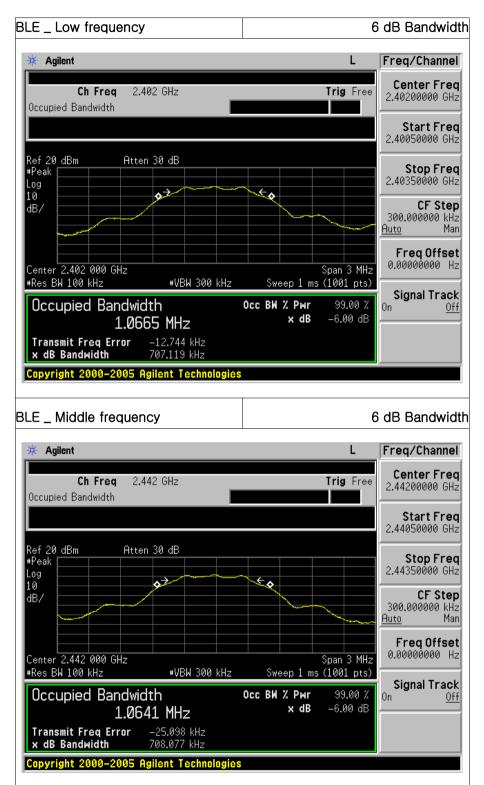
#### 6.4 Test Result

Test Mode	Test Frequency	6 dB Bandwidth (MHz)	Occupied Bandwidth (MHz)
	Low	0.707	1.034
BLE	Middle	0.708	1.032
	High	0.711	1.034

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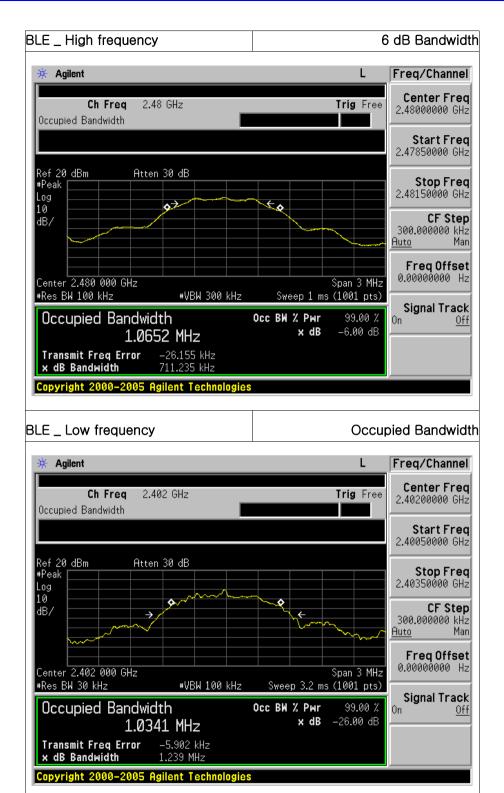


#### 6.5 Test Plot



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## 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

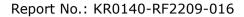
A transmitter antenna terminal of EUT is connected to the input of a spectrum analyzer. Measurement is made while the EUT is operating in transmission mode at the appropriate frequencies.

- 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

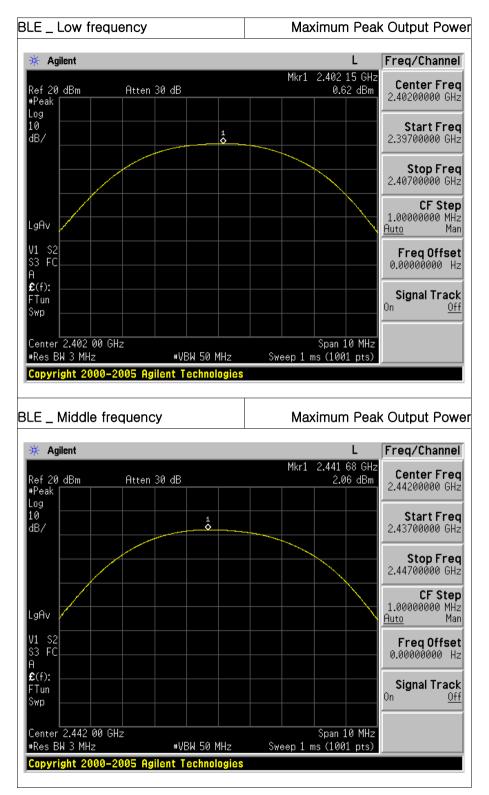
Test Mode	Tost Fraguanay	Peak Out	out Power
Test Mode	Test Frequency	dBm	mW
	Low	0.62	1.15
BLE	Middle	2.06	1.61
	High	2.43	1.75

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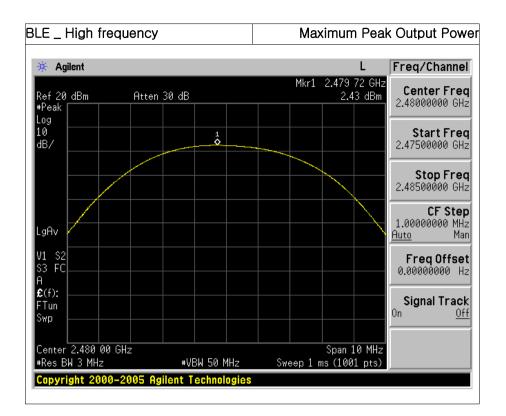


## 7.5 Test Plot



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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.

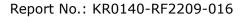
(ANSI C63.10-2013 \_ Section 11.10.2 - Method PKPSD)

- 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	-14.83
BLE	Middle	-13.46
	High	-12.99

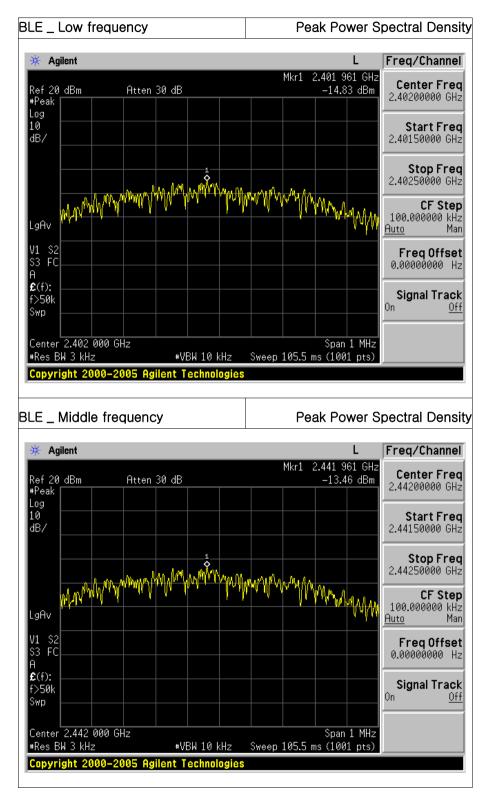
#### 8.4 Test Result

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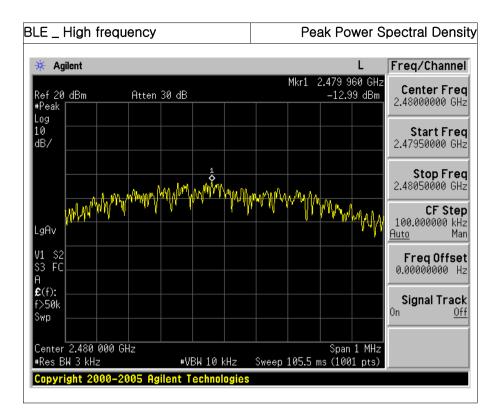


#### 8.5 Test Plot



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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

Tadiator offair flot oxecou the fit	na otrongth lovele opeenied in t	ine renewing table
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 1 or 3 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.
- 3) If a specific emission is demonstrated to be continuous (≥ 98 percent duty cycle) rather than tuming 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 BLE

#### • Low frequency

Frequency	Rea	ding		<b>E</b>	0.05	Lin	nits	Re	sult	Ma	rgin
Fiequency	(dBu	V/m)	Pol.	Factor (dB)	DCF (dB)	(dBu	ıV/m)	(dBu	V/m)	(d	в)
(MHz)	AV ,	/ Peak		(48)	(00)	AV /	Peak	AV /	Peak	AV /	Peak
2 376.21	15.05	26.25	Н	11.84	1.99	54.0	74.0	28.9	38.1	25.1	35.9
4 804.46	24.88	35.57	V	4.30	1.99	54.0	74.0	31.2	39.9	22.8	34.1

#### • Middle frequency

Fraguaday	Rea	ding		- ·	0.05	Lin	nits	Re	sult	Ma	rgin
Frequency	(dBu	V/m)	Pol.	Factor (dB)	DCF (dB)	(dBu	IV/m)	(dBu	IV/m)	(d	в)
(MHz)	AV ,	/ Peak		(42)	(00)	AV /	Peak	AV /	Peak	AV /	Peak
4 883.95	24.91	35.79	V	4.04	1.99	54.0	74.0	30.9	39.8	23.1	34.2

#### • High frequency

Fraguapay	Rea	ding		- ·		Lin	nits	Re	sult	Mai	rgin
Frequency	(dBu	V/m)	Pol.	Factor (dB)	DCF (dB)	(dBu	IV/m)	(dBu	IV/m)	(d	в)
(MHz)	AV ,	Peak		(00)	(00)	AV /	Peak	AV /	Peak	AV /	Peak
2 483.51	17.60	28.96	Н	12.21	1.99	54.0	74.0	31.8	41.2	22.2	32.8
4 959.48	27.54	36.84	V	4.21	1.99	54.0	74.0	33.7	41.1	20.3	33.0

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)

-  $T_{\text{on}}$  = 0.395 ms /  $T_{\text{off}}$  = 0.229 ms

- Duty Cycle =  $T_{on}$  / ( $T_{on}+T_{off}$ ) = 0.395 / (0.395+0.229) = 0.633

- DCF =  $10 \times \log(1/\text{Duty Cycle}) \text{ dB} = 10 \times \log(1/0.633) \text{ dB} = 1.99 \text{ dB}$ 

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



## 9.6 Test Plot for Radiated Spurious Emission

#### • BLE \_ Low frequency

MultiView 🗄 Spectrum	Spectrum 2	Spectrum 3	Spectru	m 4 🕱			▼
RefLevel 87.00 dBµV Att 0 dB 5	● RBW 1 MH SWT 1.01 ms ● VBW 3 MH	Iz Mode Auto Sweep			Fre	equency 2.3	500000 GH:
Input 1 AC F Frequency Sweep	PS On Notch C	)ff					• 1Pk Max
о dвµv						M1[1]	26.25 dBµ\ 2.3762138 GHz
'0 dBµV					-		
0 dBµV							
0 dBµV							
ю dвµv							
0 dBµV						MI	
and a substantial portion of the substances	manustrationalist	a performandation	marchanic	warmer Maryak	wanter	andregations	ورامهم بريار معوراته ورا
20 dBµV							
.0 dвµv							
dвµv							
		1001 pts	8.	<sup>0 MHz/</sup> Res	tricted	Band -	
2.31 GHz	Spectrum 2	1001 pts	8.	Res	tricted	Band –	2.39 GHz
Ref Level 87.00 dBµV Att 0 dB 5	Spectrum 2     RBW 1 Mi SWT 1.01 ms VBW 3 Mi	Spectrum 3	Spectrum SGL	Res			Averag
2.31 GHz MultiView ⊕ Spectrum Ref Level 87.00 dBµV	Spectrum 2     RBW 1 Mi SWT 1.01 ms VBW 3 Mi	Spectrum 3	Spectrum SGL	Res		equency 2.3	Averag v 500000 GH: •1Rm Avg
2.31 GHz           MultiView         € Spectrum           Ref Level         87.00 dBµ/           Att         0 dB           Input         1 ACC	Spectrum 2     RBW 1 Mi SWT 1.01 ms VBW 3 Mi	Spectrum 3	Spectrum SGL	Res		equency 2.3	Averag v 500000 GH: •1Rm Avg
2.31 GHz MultiView ∰ Spectrum Ref Level 87.00 dBµ/ Att 0 dB s Input 1AC F Frequency Sweep	Spectrum 2     RBW 1 Mi SWT 1.01 ms VBW 3 Mi	Spectrum 3	Spectrum SGL	Res		equency 2.3	Averag ▼ 500000 GH: ■18m Avg 15.05 dBµA
2.31 GHz MultiView ∰ Spectrum Ref Level 87.00 dBµ/ Att 0 dB s Input 1AC F Frequency Sweep	Spectrum 2     RBW 1 Mi SWT 1.01 ms VBW 3 Mi	Spectrum 3	Spectrum SGL	Res		equency 2.3	Averag ▼ 500000 GH: ■18m Avg 15.05 dBµA
2.31 GHz           MultiView         E           Spectrum           Ref Level         87.00 dBµV           Att         0 dB           Input         1 AC           Frequency Sweep           10 dBµV	Spectrum 2     RBW 1 Mi SWT 1.01 ms VBW 3 Mi	Spectrum 3	Spectrum SGL	Res		equency 2.3	Averag ▼ 500000 GH: ■18m Avg 15.05 dBµA
2.31 GHz MultiView ∰ Spectrum Ref Level 87.00 dBµV Att 0 dB s Input 1 AC F Frequency Sweep 10 dBµV	Spectrum 2     RBW 1 Mi SWT 1.01 ms VBW 3 Mi	Spectrum 3	Spectrum SGL	Res		equency 2.3	Averag ▼ 500000 GH: ■18m Avg 15.05 dBµA
2.31 GHz           4ultiView         E         Spectrum           Ref Level         87.00 db/V         0 dB         5           Input         0 dB         5         1         1         AC         F           Frequency         1 AC         F         1         AC         F         6         8         9         0 </td <td>Spectrum 2     RBW 1 Mi SWT 1.01 ms VBW 3 Mi</td> <td>Spectrum 3</td> <td>Spectrum SGL</td> <td>Res</td> <td></td> <td>equency 2.3</td> <td>Averag ▼ 500000 GH: ■18m Avg 15.05 dBµA</td>	Spectrum 2     RBW 1 Mi SWT 1.01 ms VBW 3 Mi	Spectrum 3	Spectrum SGL	Res		equency 2.3	Averag ▼ 500000 GH: ■18m Avg 15.05 dBµA
2.31 GHz           4ultiView         Spectrum           Ref Level 87.00 dbµ/           Att         0 db 2           Input         1 AC           Frequency Sweep           0 dbµ/           0 dbµ/           0 dbµ/           0 dbµ/           0 dbµ/	Spectrum 2     RBW 1 Mi SWT 1.01 ms VBW 3 Mi	Spectrum 3	Spectrum SGL	Res		equency 2.3	Averag ▼ 500000 GH: ■18m Avg 15.05 dBµA
2.31 GHz           4ultiView         Spectrum           Ref Level 87.00 dbµ/           Att         0 db 2           Input         1 AC           Frequency Sweep           0 dbµ/           0 dbµ/           0 dbµ/           0 dbµ/           0 dbµ/	Spectrum 2     RBW 1 Mi SWT 1.01 ms VBW 3 Mi	Spectrum 3	Spectrum SGL	Res		equency 2.3	Averag ▼ 500000 GH: ■18m Avg 15.05 dBµA
2.31 GHz           MultiView         Spectrum           Ref Level 87.00 dbµ/           Att         0 dB 2           Input         1 AC           Frequency Sweep           0 dbµ/	Spectrum 2     RBW 1 Mi SWT 1.01 ms VBW 3 Mi	Spectrum 3	Spectrum SGL	Res		equency 2.3	Averag ▼ 500000 GH: ■18m Avg 15.05 dBµA
Spectrum           MultiView         Spectrum           Ref Level 87.00 dbµ/         0 dB £           Att         0 dB £           Input         1 AC           Frequency Sweep         0           0 dbµ/         0	Spectrum 2     RBW 1 Mi SWT 1.01 ms VBW 3 Mi	Spectrum 3	Spectrum SGL	Res		equency 2.3	Averag ▼ 500000 GH: ■18m Avg 15.05 dBµA
2.31 GHz           MultiView         E           Spectrum           Ref Level         87.00 dBµV           Att         0 dB           Input         1 AC           Frequency Sweep           10 dBµV	Spectrum 2     RBW 1 Mi SWT 1.01 ms VBW 3 Mi	Spectrum 3	SGL Count 100/100	Res		equency 2.3	Averag ▼ 500000 GH: ■18m Avg 15.05 dBµA
Spectrum           MultiView         Spectrum           Ref Level 87.00 dBµV         0 dB s           Att         0 dB s           Input         1 AC           Frequency Sweep         0           0 dBµV         0	Spectrum 2     RBW 1 Mi SWT 1.01 ms VBW 3 Mi	Spectrum 3	Spectrum SGL	Res		equency 2.3	Averag ▼ 500000 GH: ■18m Avg 15.05 dBµA
AultiView         Spectrum           Ref Level 87.00 dbµV         0 dB s           Att         0 dB s           Input         1 AC           Frequency Sweep         0           0 dbµV         0	Spectrum 2     RBW 1 Mi SWT 1.01 ms VBW 3 Mi	Spectrum 3	SGL Count 100/100	Res		equency 2.3	Averag ▼ 500000 GH: ■18m Avg 15.05 dBµA
AultiView         Spectrum           Ref Level 87.00 dbµV         0 dB s           Att         0 dB s           Input         1 AC           Frequency Sweep         0           0 dbµV         0	Spectrum 2     RBW 1 Mi SWT 1.01 ms VBW 3 Mi	Spectrum 3	SGL Count 100/100	Res		equency 2.3	Averag ▼ 500000 GH: ■18m Avg 15.05 dBµA
Spectrum           MultiView         Spectrum           Ref Level 87.00 dbµ/         0 dB £           Att         0 dB £           Input         1 AC           Frequency Sweep         0           0 dbµ/         0	Spectrum 2     RBW 1 Mi SWT 1.01 ms VBW 3 Mi	Spectrum 3	SGL Count 100/100	Res		equency 2.3	Averag ▼ 500000 GH: ■18m Avg 15.05 dBµA

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								Spuriou	is – Pea
MultiView 8	Spectrum	x Sp	pectrum 2	I Spect	rum 3 🛛	z]			
Ref Level 80.0 Att	10 dBµV 0 dB <b>SWT</b> 1		VI1MHz VI3MHz Mode	e Auto Sweep		~	Fn	equency 4.8	040000 GHz
Input Frequency Sv	1 AC PS	Off Not						equency me	• 1Pk Max
								M1[1] 4	35.57 dBµV .80445954 GHz
70 dBµV									
50 dBµV									
50 dBµV									
Ю dBµV					M1				
ambhalatha	www.mellinewy		multiple stands	upama your	and have been a	Whenderstein	light make from		a hadron and a
ю dBµV		denn, scholowelle	A Designed and				and a second finance	e-A-V-H u B-E-Verlande B13	and constructions
20 dBµV									
LO dBµV									
) dBµV									
-10 dBµV									
F 4.804 GHz			1001 pt	s		L.0 MHz/			Span 10.0 MHz
							Spu	irious –	Average
	γ			$\neg$	6	5			
Ref Level 80.0	<u> </u>	$\sim$	v 1 MHz	Spect	rum 3 2 SGL	<u>x</u>			▽
Att Input	0 dB SWT 1 1 AC PS	.01 ms  VBV Off Not	V/3 MHz Mode ch Off	e Auto Sweep	Count 100/100	C	Fn	equency 4.8	040000 GHz
Frequency Sv									
								M1[1]	<ul> <li>1Rm Avg</li> <li>24.88 dBµV</li> <li>802000 10 CHz</li> </ul>
70 dBµV									
									24.88 dBµV
20									24.88 dBµV
60 dBµV									24.88 dBµV
50 dBµV									24.88 dBµV
50 dBµV									24.88 dBµV
50 dBµv									24.88 dBµV
50 dBµv		مرین میں میں اور میں							24.88 dBµV
60 dBµv		alfred and a start		M					24.88 dBµV
50 dBµV 50 dBµV 40 dBµV 30 dBµV 20 dBµV		ng an da mark		- Mi					24.88 dBµV
50 dbµv 50 dbµv 40 dbµv 80 dbµv 80 dbµv 20 dbµv 10 dbµv		Mense-rol-		M					24.88 dBµV
50 dbµv 50 dbµv 40 dbµv 80 dbµv 80 dbµv 20 dbµv 10 dbµv		"lande-pul							24.88 dBµV
0 dbµv 0 dbµv 0 dbµv 0 dbµv 0 dbµv 0 dbµv 0 dbµv 0 dbµv		angeografie-medi							24.88 dBµV
70 dBµV 50 dBµV 50 dBµV 40 dBµV 40 dBµV 20 dBµV 10 dBµV -10 dBµV -10 dBµV -10 dBµV -10 dBµV -10 dBµV		"Anna - cole	1001 pt			.0 MHz/			24.88 dBµV

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• BLE \_ Middle frequency

								Spunor	ıs – Pea
MultiView 8	Spectrum	x S	pectrum 2	I Spect	rum 3 🛛 🛛				
Ref Level 80.0 Att	0 dBµV	• RB\	M 1 MHz N/3 MHz Mode			1	Fr	equency 4.8	840000 GHz
Input Frequency Sv	1 AC PS	Off Not	ch Off	, nato entrep				equency 4.0	•1Pk Max
								M1[1]	35.79 dBµV
0 dBµV									.88395005 GHZ
-80									
0 dBµV									
0 dBµV									
0 dBµV			-						
1	1.0		a Martin	mannen	handuphallow	and the second			enternance
o deuv	nten gelen schummen hann	an shirt and a second	Martin Angel			and the second states of	on the last shares	and a start of the second start of the	-spattan - manager
0 dBµV									
0 dBµV									
і dвµV								2	
10 dBµV									
F 4.884 GHz			1001 pt			.0 MHz/			Span 10.0 MHz
1001012			1001 pt	2		10 11127			opun 1010 mile
							Spi	irious -	Averag
MultiView 🗄	Enoctrum	X SI	pectrum 2	Spect	rum 3 🛛 🛛	Ĵ			
Ref Level 80.0	10 dBµV	• RB	N 1 MHz		SGL				
Att Input	1 AC PS	1.01 ms • VBV Off Not	N 3 MHz Mode ch Off	: Auto Sweep	Count 100/100		Fr	equency 4.8	840000 GHz
Frequency Sv	weep							M1[1]	<ul> <li>1Rm Avg</li> <li>24.91 dBµV</li> </ul>
70 dBµV		1							
о авру									.88388012 GHz
0 dBµV									
0 dBµV									
0 dBµV									
0 dBµV									
0 dBµV									
0 dBµV				Mi					
0 d8µv				Ma					
ia deµv				Ma					
50 d8µv				MI					
0 deµv 0 deµv 0 deµv 0 deµv 0 deµv 0 deµv				MI					
0 d8µv				MI		· · · · · · · · · · · · · · · · · · ·			
0 dBµv				M					
50 dBµV 50 dBµV 40 dBµV 40 dBµV 10 dBµV 10 dBµV -10 dBµV				Mi					

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#### • BLE \_ High frequency

MultiView 8	Spectrum	Spectr	rum 2 🕅 🕱	Spectrum 3	Spectru	m 4 🕱			⊽
Ref Level 87 Att	0 dB SW	● RI /T 1.01 ms ● VI	BW 1 MHz BW 3 MHz Me	ode Auto Sweep			Fr	equency 2	4917500 GH:
Input Frequency S	1 AC PS	On N	otch Off	ode Auto Sweep				equency zi	• 1Pk Max
en equene, e							N	1[1]	28.96 dBµ\
80 dBµV								-	2.4835082 GH
70 dBµV		-							
i0 dBµV									
ю dBµV									
Ю dBµV		-							
1 Ю dBµV		_	-						
When my when	automotion	have and a mouth	madentedance	stranderseem	He am reason	Languermotion	untranne mensalist	aundereddor	mounterheret
ю dBµV			and the second states in the	and the second second		1.1.1			and the manual
0 dBµV									
I dBµV									
10 db.0									
			1001	pts	1.6	65 MHz/ Res	tricted	Band -	2.5 GHz - Averag
2.4835 GHz	Chastrum	Spectr		~		Res	tricted	Band -	- Averaç
2.4835 GHz AultiView 8 Ref Level 87			rum 2 🕅 BW 1 MHz	Spectrum 3	Spectrum SGL	Res			- Averaç
AultiView B Ref Level 87 Att Input	'.00 dBµV 0 dB S¥ 1 AC PS	● RI /T 1.01 ms ● VI	rum 2 🛛 🕅 BW 1 MHz BW 3 MHz Me	Spectrum 3	Spectrum SGL	Res			- Averag
Att Input	'.00 dBµV 0 dB S¥ 1 AC PS	● RI /T 1.01 ms ● VI	rum 2 🕅 BW 1 MHz BW 3 MHz Me	Spectrum 3	Spectrum SGL	Res	Fr		- Averaç ▼ 4917500 GH: •1Rm Avg 17.60 dBµA
AultiView and Au	'.00 dBµV 0 dB S¥ 1 AC PS	● RI /T 1.01 ms ● VI	rum 2 🕅 BW 1 MHz BW 3 MHz Me	Spectrum 3	Spectrum SGL	Res	Fr	equency 2.	- Averag 4917500 GH:
AultiView and Au	'.00 dBµV 0 dB S¥ 1 AC PS	● RI /T 1.01 ms ● VI	rum 2 🕅 BW 1 MHz BW 3 MHz Me	Spectrum 3	Spectrum SGL	Res	Fr	equency 2.	- Averaç ▼ 4917500 GH: •1Rm Avg 17.60 dBµA
AultiView H Ref Level 87 Att Input Frequency S 0 d8µV	'.00 dBµV 0 dB S¥ 1 AC PS	● RI /T 1.01 ms ● VI	rum 2 🕅 BW 1 MHz BW 3 MHz Me	Spectrum 3	Spectrum SGL	Res	Fr	equency 2.	- Averaç ▼ 4917500 GH: •1Rm Avg 17.60 dBµA
2.4835 GHz MultiView ↔ Ref Level 87 Att Input Frequency S 10 d8µV	'.00 dBµV 0 dB S¥ 1 AC PS	● RI /T 1.01 ms ● VI	rum 2 🕅 BW 1 MHz BW 3 MHz Me	Spectrum 3	Spectrum SGL	Res	Fr	equency 2.	- Averaç ▼ 4917500 GH: •1Rm Avg 17.60 dBµA
2.4835 GHz MultiView ↔ Ref Level 87 Att Input Frequency S 10 d8µV	'.00 dBµV 0 dB S¥ 1 AC PS	● RI /T 1.01 ms ● VI	rum 2 🕅 BW 1 MHz BW 3 MHz Me	Spectrum 3	Spectrum SGL	Res	Fr	equency 2.	- Averaç ▼ 4917500 GH: •1Rm Avg 17.60 dBµA
2.4835 GHz  MultiView ↔ Ref Level 87 Att Input Input Input Input Input 0 d8µV  0 d8µV  0 d8µV	'.00 dBµV 0 dB S¥ 1 AC PS	● RI /T 1.01 ms ● VI	rum 2 🕅 BW 1 MHz BW 3 MHz Me	Spectrum 3	Spectrum SGL	Res	Fr	equency 2.	- Averaç ▼ 4917500 GH: •1Rm Avg 17.60 dBµA
2.4835 GHz  MultiView ↔ Ref Level 87 Att Input Input Input Input Input 0 d8µV  0 d8µV  0 d8µV	'.00 dBµV 0 dB S¥ 1 AC PS	● RI /T 1.01 ms ● VI	rum 2 🕅 BW 1 MHz BW 3 MHz Me	Spectrum 3	Spectrum SGL	Res	Fr	equency 2.	- Averaç ▼ 4917500 GH: •1Rm Avg 17.60 dBµA
2.4835 GHz           MultiView           Ref Level           10 dsµV           10 dsµV           10 dsµV           10 dsµV           10 dsµV	'.00 dBµV 0 dB S¥ 1 AC PS	● RI /T 1.01 ms ● VI	rum 2 🕅 BW 1 MHz BW 3 MHz Me	Spectrum 3	Spectrum SGL	Res	Fr	equency 2.	- Averaç ▼ 4917500 GH: •1Rm Avg 17.60 dBµA
2.4835 GHz           MultiView           Ref Level           10 dsµV           10 dsµV           10 dsµV           10 dsµV           10 dsµV	'.00 dBµV 0 dB S¥ 1 AC PS	● RI /T 1.01 ms ● VI	rum 2 🕅 BW 1 MHz BW 3 MHz Me	Spectrum 3	Spectrum SGL	Res	Fr	equency 2.	- Averaç ▼ 4917500 GH: •1Rm Avg 17.60 dBµA
2.4835 GHz           MultiView           Ref Level 87           Att           Input           Frequency S           10 d8µV           10 d8µV           10 d8µV           10 d8µV           10 d8µV           10 d8µV	'.00 dBµV 0 dB S¥ 1 AC PS	● RI /T 1.01 ms ● VI	rum 2 🕅 BW 1 MHz BW 3 MHz Me	Spectrum 3	Spectrum SGL	Res	Fr	equency 2.	- Averaç ▼ 4917500 GH: •1Rm Avg 17.60 dBµA
Ref Level 87 Att	'.00 dBµV 0 dB S¥ 1 AC PS	● RI /T 1.01 ms ● VI	rum 2 🕅 BW 1 MHz BW 3 MHz Me	Spectrum 3	Spectrum SGL	Res	Fr	equency 2.	- Averaç ▼ 4917500 GH: •1Rm Avg 17.60 dBµA
2.4835 GHz           MultiView           Ref Level 87           Att           Input           Frequency S           10 d8µV           10 d8µV           10 d8µV           10 d8µV           10 d8µV           10 d8µV	'.00 dBµV 0 dB S¥ 1 AC PS	● RI /T 1.01 ms ● VI	rum 2 🕅 BW 1 MHz BW 3 MHz Me	Spectrum 3	Spectrum SGL	Res	Fr	equency 2.	- Averaç ▼ 4917500 GH: •1Rm Avg 17.60 dBµA
2.4835 GHz           MultiView           Ref Level 87           Att           Input           Frequency S           00 dbµV           10 dbµV	'.00 dBµV 0 dB S¥ 1 AC PS	● RI /T 1.01 ms ● VI	rum 2 IX BW 1 MHz BW 3 MHz Mo otch Off	Spectrum 3 ade Auto Sweep	SGL Count 100/100	Res	Fr	equency 2.	- Averag
2.4835 GHz           MultiView           Ref Level 87           Att           Input           Frequency S           10 dbµV	'.00 dBµV 0 dB S¥ 1 AC PS	PT 1.01 ms = VI	rum 2 IX BW 1 MHz BW 3 MHz Mu otch Off	Spectrum 3 ade Auto Sweep	SGL Count 100/100	Res	Fr	equency 2.	- Averag
2.4835 GHz           AultiView           Ref Level 87           Att           Input           Frequency S           0 d8µV	'.00 dBµV 0 dB S¥ 1 AC PS	PT 1.01 ms = VI	rum 2 IX BW 1 MHz BW 3 MHz Mu otch Off	Spectrum 3 ade Auto Sweep	SGL Count 100/100	Res	Fr	equency 2.	- Averag
2.4835 GHz           MultiView           Ref Level 87           Att           Input           Frequency S           00 dbµV           10 dbµV	'.00 dBµV 0 dB S¥ 1 AC PS	PT 1.01 ms = VI	rum 2 IX BW 1 MHz BW 3 MHz Mu otch Off	Spectrum 3 ade Auto Sweep	SGL Count 100/100	Res	Fr	equency 2.	- Averag
2.4835 GHz           MultiView           Ref Level 87           Att           Input           Frequency S           00 dbµV	'.00 dBµV 0 dB S¥ 1 AC PS	PT 1.01 ms = VI	rum 2 IX BW 1 MHz BW 3 MHz Mu otch Off	Spectrum 3 ade Auto Sweep	SGL Count 100/100	Res	Fr	equency 2.	- Averag

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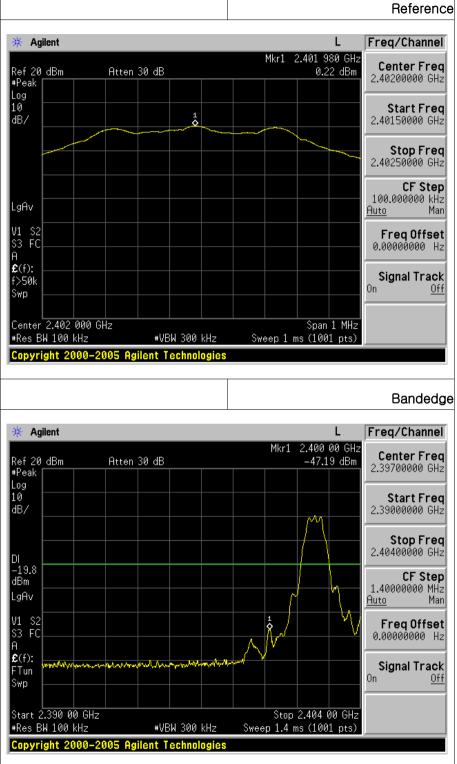
							Spuriou	is – Pea
MultiView 8	Spectrum	x) s	pectrum 2	I Spect	rum 3 🛛 🕱			
Ref Level 80.0 Att Input	0 dBµV 0 dB SWT : 1 AC PS	● RE 1.01 ms ● VB Off No	W 1 MHz W 3 MHz Mod	e Auto Sweep			Frequency 4.9	600000 GHz
1 Frequency Sv							M1[1]	1Pk Max 36.84 dBµV
70 dBµV								1.95948052 GHz
60 dBµV								
50 dBµV								
40 dBµV		-		ME				
when the star	NAME AND ADDRESS OF A	. admini	managentermation	montailmanst	and a way way	Venture - hale	wohner wohn harder	N. a. day such a
30 dBµV	n norman, ne si krosle spe	and the second	202-29.11.1.1	-		a second second	and the second	a ann an the ann an Annal an Anna A
20 dBµV								
10 dBµY								
0 dBµV								
-10 dBµV				-				
CF 4.96 GHz			1001 p	ts	1.0 M	H7/		Span 10.0 MHz
MultiView 🔠	Spectrum	x	pectrum 2	X Spect	rum 3 🕅		Spurious -	
Ref Level 80.0 Att		$\sim$	W 1 MHz		GL		Frequency 4.9	
nu	0 dBµV 0 dB SWT :	1.01 ms • VB			• • • • • • • • • • • • • • • • • • • •		inequeine; ins	
Input	0 dB SWT : 1 AC PS	L.01 ms • VB Off No	tch Off					●1Rm Avg
Input Frequency Sv	0 dB SWT : 1 AC PS	1.01 ms 🖷 VB	tch Off				M1[1]	●1Rm Avg
Input Frequency Sv	0 dB SWT : 1 AC PS	1.01 ms 🖷 VB	tch Off					<ul> <li>1Rm Avg</li> <li>27.54 dBμV</li> </ul>
Input I Frequency Sw 70 dBµV	0 dB SWT : 1 AC PS	1.01 ms 🖷 VB	tch Off					<ul> <li>1Rm Avg</li> <li>27.54 dBμV</li> </ul>
Input Frequency Sw 70 dBµV	0 dB SWT : 1 AC PS	1.01 ms 🖷 VB	tch Off					<ul> <li>1Rm Avg</li> <li>27.54 dBμV</li> </ul>
Input           Frequency Sv           70 d8μV           60 d8μV           50 d8μV	0 dB SWT : 1 AC PS	1.01 ms 🖷 VB	tch Off					<ul> <li>1Rm Avg</li> <li>27.54 dBμV</li> </ul>
Input           I Frequency Sv           70 d8μν           60 d8μν           50 d8μν	0 dB SWT : 1 AC PS	1.01 ms 🖷 VB	tch Off					<ul> <li>1Rm Avg</li> <li>27.54 dBμV</li> </ul>
	0 dB SWT : 1 AC PS	1.01 ms 🖷 VB	tch Off					<ul> <li>1Rm Avg</li> <li>27.54 dBμV</li> </ul>
Input           Frequency SV           70 d8μν           50 d8μν           50 d8μν           40 d8μν           40 d8μν	0 dB SWT : 1 AC PS	1.01 ms 🖷 VB	tch Off					<ul> <li>1Rm Avg</li> <li>27.54 dBμV</li> </ul>
Input           Frequency Sx           70         dBµv           70         dBµv           50         dBµv           40         dBµv           40         dBµv           40         dBµv           20         dBµv	0 dB SWT : 1 AC PS	1.01 ms 🖷 VB	tch Off					<ul> <li>1Rm Avg</li> <li>27.54 dBμV</li> </ul>
Input           I Frequency Sx           70 dBµv           60 dBµv           50 dBµv           40 dBµv           40 dBµv           20 'dBµv           10 dBµv	0 dB SWT : 1 AC PS	1.01 ms 🖷 VB						<ul> <li>1Rm Avg</li> <li>27.54 dBμV</li> </ul>
Input           Frequency Sx           70         dBµv           70         dBµv           50         dBµv           40         dBµv           40         dBµv           40         dBµv           20         dBµv	0 dB SWT : 1 AC PS	1.01 ms 🖷 VB						<ul> <li>1Rm Avg</li> <li>27.54 dBμV</li> </ul>
Input           Frequency Sx           70         dBµv           70         dBµv           50         dBµv           50         dBµv           40         dBµv           40         dBµv           20         dBµv           10         dBµv	0 dB SWT : 1 AC PS	1.01 ms 🖷 VB						<ul> <li>1Rm Avg</li> <li>27.54 dBμV</li> </ul>

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#### 9.7 Test Plot for Conducted Spurious Emission

BLE \_ Low frequency



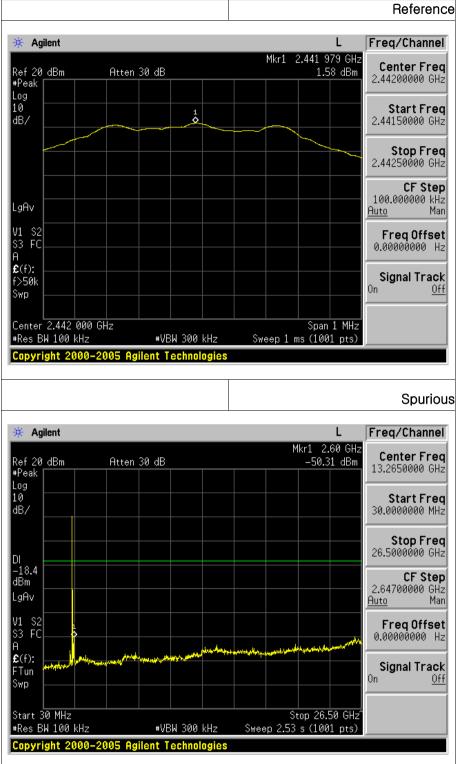
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Agilent				RL	Freq/Channe
ef 20 dBm Peak	Atten 30 dB		М	kr1 2.57 GHz -48.59 dBm	Center Fre 13.2650000 GH
og Ø B/					Start Free 30.0000000 MH
					Stop Fre 26.5000000 GH
19.8 Bm gAv					<b>CF Stej</b> 2.64700000 GH <u>Auto</u> Ma
1 \$2 <u>1</u> 3 FC <b>3</b>			المروحة والمروحة والمروحة والمروحة والمروحة		FreqOffse 0.00000000 H
(f): Tun wp	da jaran dalaka dala				<b>Signal Trac</b> <sup>On <u>Of</u></sup>
tart 30 MHz Res BW 100 kHz	#URL			op 26.50 GHz^ s (1001 pts)	



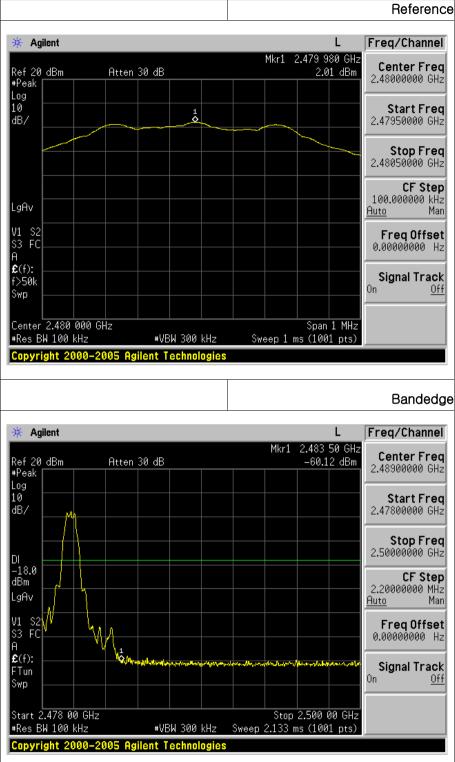
BLE \_ Middle frequency



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BLE \_ High frequency



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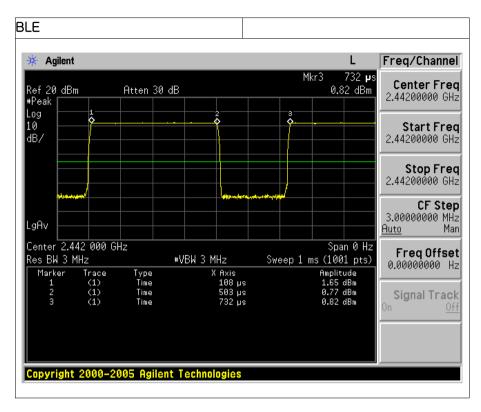


Agilent						L	Freq/Channe
ef 20 dBm	Atten 30 dB			Mł	(r1 2.3 -54.40		Center Fre 13.2650000 GH
)g ) 3/							<b>Start Fre</b> 30.0000000 MH
							<b>Stop Fre</b> 26.5000000 GH
L8.0 3m 9Av							<b>CF Ste</b> 2.64700000 GH <u>Auto</u> Mi
L S2 3 FC ¢		. James 1	have shared a	. aslandhadalad	مىلغۇر. <del>ئ</del> ەرلىلىر	quarte	Freq Offse 0.00000000
(f): Fun maketer vp	And the second						<b>Signal Trac</b> On <u>O</u>
art 30 MHz Res BW 100 kHz		 BW 300 kHz		Sti 9 2.53	op 26.5		

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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			

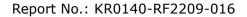
\* Decreases with the logarithm of the frequency

# 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.

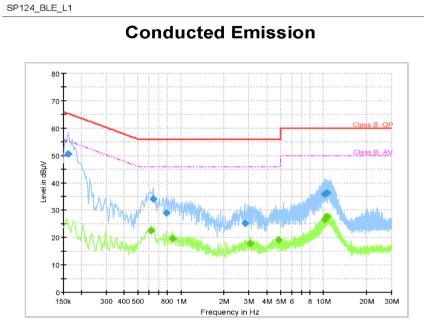
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#### 10.4 Test Result

• AC Line Conducted Emission (Graph)

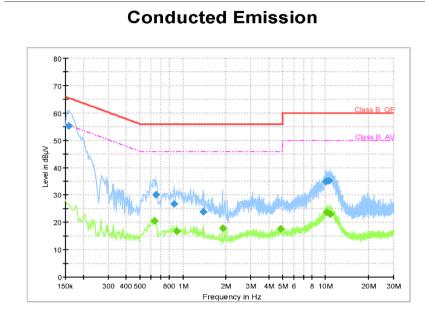


#### Final\_Result

Frequency	QuasiPeak	CAverage	Limit	Margin	Bandwidth	Line	Corr.
(MHz)	(dBµV)	(dBµV)	(dBµV)	(dB)	(kHz)		(dB)
0.162	50.56		65.36	14.80	9	L1	19.4
0.620		22.40	46.00	23.60	9	L1	19.8
0.640	34.19		56.00	21.81	9	L1	19.8
0.790	28.92		56.00	27.08	9	L1	19.8
0.880		19.67	46.00	26.33	9	L1	19.8
2.820	25.29		56.00	30.71	9	L1	19.7
3.070		17.92	46.00	28.08	9	L1	19.7
4.830		19.17	46.00	26.83	9	L1	19.8
10.140		26.44	50.00	23.56	9	L1	20.0
10.200	35.89		60.00	24.11	9	L1	20.0
10.540		27.61	50.00	22.39	9	L1	20.0
10.550	36.33		60.00	23.67	9	L1	20.0

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#### Final Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Bandwidth (kHz)	Line	Corr.
		(ασμν)					(dB)
0.158	55.24		65.57	10.33	9	N	19.4
0.630		20.44	46.00	25.56	9	N	19.8
0.650	30.02		56.00	25.98	9	N	19.8
0.870	26.75		56.00	29.25	9	N	19.8
0.910		16.78	46.00	29.22	9	N	19.7
1.390	23.95		56.00	32.05	9	N	19.7
1.900		17.84	46.00	28.16	9	N	19.7
4.830		17.60	46.00	28.40	9	N	19.8
10.040	35.03		60.00	24.97	9	N	20.0
10.160		23.61	50.00	26.39	9	N	20.0
10.510	35.25		60.00	24.75	9	N	20.0
10.810		22.97	50.00	27.03	9	N	20.0

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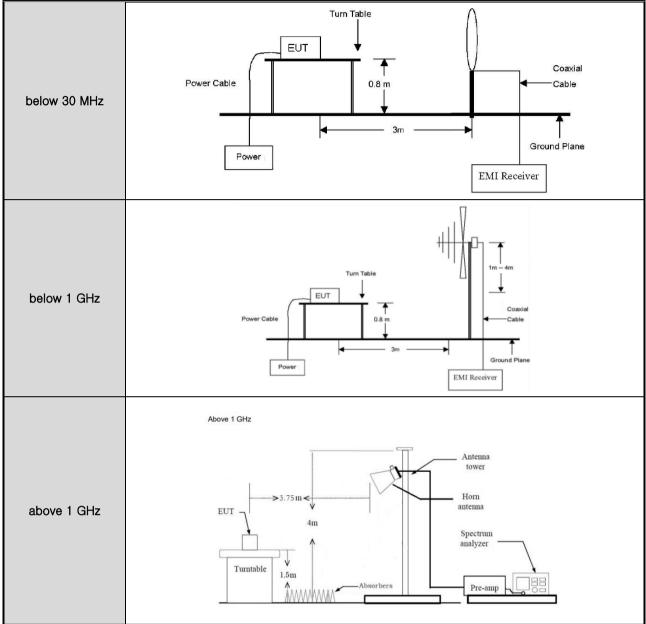
APPENDIX I

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