

FCC ID: 2AUXK -Y08UA00
Report No.: T190715L03-RP

Page: 1 / 63
Rev.: 01

RADIO TEST REPORT

FCC 47 CFR PART 15 SUBPART C

Test Standard	FCC Part 15.247
Product name	COMMUN.CONT.UNIT ASSY(BT Dongle)
Brand Name	YAMAHA
Model No.	Y08U-A00
Test Result	Pass
Statements of Conformity	Determination of compliance is based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

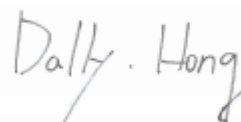
The test Result was tested by Compliance Certification Services Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were given in ANSI C63.10: 2013 and compliance standards.

The test results of this report relate only to the tested sample (EUT) identified in this report.

The test Report of full or partial shall not copy. Without written approval of Compliance Certification Services Inc. (Wugu Laboratory)

Approved by:

Tested by:



Kevin Tsai
Deputy Manager

Dally Hong
Engineer

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.
除非另有說明，此報告結果僅對測試之樣品負責，同時此樣品僅保留90天。本報告未經本公司書面許可，不可部分複製。

This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at www.sgs.com/terms_and_conditions.htm and for electronic format documents, subject to Terms and Conditions for Electronic Documents at www.sgs.com/terms_e-document.htm. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.



Report No.: T190715L03-RP

Page: 2 / 63

Rev.: 01

Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	November 21, 2019	Initial Issue	ALL	May Lin
01	November 29, 2019	See the following Note Rev. (01)	P.9, P.10, P.12, P.16, P.33, A-2	May Lin

Rev (01):

1. Revised the section 1.7 、 section 2 、 section 3.2 、 section 4.2.2 、 test data and test setup photo title.



Report No.: T190715L03-RP

Page: 3 / 63
Rev.: 01

Table of contents

1.	GENERAL INFORMATION	4
1.1	EUT INFORMATION	4
1.2	EUT CHANNEL INFORMATION	5
1.3	ANTENNA INFORMATION	5
1.4	MEASUREMENT UNCERTAINTY	6
1.5	FACILITIES AND TEST LOCATION	7
1.6	INSTRUMENT CALIBRATION	8
1.7	SUPPORT AND EUT ACCESSORIES EQUIPMENT	9
2.	TEST SUMMERY	10
3.	DESCRIPTION OF TEST MODES.....	11
3.1	THE WORST MODE OF OPERATING CONDITION	11
3.2	THE WORST MODE OF MEASUREMENT	12
3.3	EUT DUTY CYCLE	13
4.	TEST RESULT	14
4.1	AC POWER LINE CONDUCTED EMISSION	14
4.2	6dB BANDWIDTH AND OCCUPIED BANDWIDTH(99%).....	16
4.3	OUTPUT POWER MEASUREMENT	22
4.4	POWER SPECTRAL DENSITY	25
4.5	CONDUCTED BAND EDGE AND SPURIOUS EMISSION	29
4.6	RADIATION BANDEDGE AND SPURIOUS EMISSION	36
APPENDIX 1 - PHOTOGRAPHS OF EUT		



Report No.: T190715L03-RP

Page: 4 / 63
Rev.: 01

1. GENERAL INFORMATION

1.1 EUT INFORMATION

Applicant	CHAO LONG MOTOR PARTS CORP. No.10, Lane 151, Sec.2, Guangming Rd., Luzhu Dist., Taoyuan City, 33848, Taiwan
Manufacturer	PT Chao Long Motor Parts Indonesia. Jl. Meranti I Blok L2 No.5-6, Delta Silicon Industrial Park Lippo Cikarang, Bekasi, Jawa Barat 17550 Indonesia
Equipment	COMMUN.CONT.UNIT ASSY(BT Dongle)
Model No.	Y08U-A00
Model Discrepancy	N/A
Trade Name	YAMAHA
Received Date	July 15, 2019
Date of Test	September 10 ~ 11, 2019
Output Power (W)	Bluetooth 4.2: 0.0010 Bluetooth 5.0: 0.0010
Power Supply	DC 12V
S.W Version	V0.23
H.W: Version	T8



Report No.: T190715L03-RP

Page: 5 / 63
Rev.: 01

1.2 EUT CHANNEL INFORMATION

Frequency Range	2402MHz-2480MHz
Modulation Type	Bluetooth 4.2: GFSK for BLE-1Mbps Bluetooth 5.0: GFSK for BLE-2Mbps
Number of channel	40 Channels

Remark:

Refer as ANSI C63.10: 2013 clause 5.6.1 Table 4 for test channels

Number of frequencies to be tested		
Frequency range in which device operates	Number of frequencies	Location in frequency range of operation
☐ 1 MHz or less	1	Middle
☐ 1 MHz to 10 MHz	2	1 near top and 1 near bottom
☒ More than 10 MHz	3	1 near top, 1 near middle, and 1 near bottom

1.3 ANTENNA INFORMATION

Antenna Type	☐ PIFA ☒ PCB ☐ Dipole ☐ Coils
Antenna Gain	1.78dBi
Antenna Connector	N/A



Report No.: T190715L03-RP

Page: 6 / 63
Rev.: 01

1.4 MEASUREMENT UNCERTAINTY

PARAMETER	UNCERTAINTY
AC Powerline Conducted Emission	+/- 1.2575
Emission bandwidth, 20dB bandwidth	+/- 1.4003
RF output power, conducted	+/- 1.1372
Power density, conducted	+/- 1.4003
3M Semi Anechoic Chamber / 30M~200M	+/- 4.0138
3M Semi Anechoic Chamber / 200M~1000M	+/- 3.9483
3M Semi Anechoic Chamber / 1G~8G	+/- 2.5975
3M Semi Anechoic Chamber / 8G~18G	+/- 2.6112
3M Semi Anechoic Chamber / 18G~26G	+/- 2.7389
3M Semi Anechoic Chamber / 26G~40G	+/- 2.9683

Remark:

1. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$
2. ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report.



Report No.: T190715L03-RP

Page: 7 / 63

Rev.: 01

1.5 FACILITIES AND TEST LOCATION

All measurement facilities used to collect the measurement data are located at

No.11, Wugong 6th Rd., Wugu Dist., New Taipei City 24891, Taiwan. (R.O.C.)

Test site	Test Engineer	Remark
AC Conduction Room	Dally Hong	
Radiation	Jerry Lu	
RF Conducted	Dally Hong	

Remark: The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.



Report No.: T190715L03-RP

Page: 8 / 63
Rev.: 01

1.6 INSTRUMENT CALIBRATION

RF Conducted Test Site					
Equipment	Manufacturer	Model	S/N	Cal Date	Cal Due
Coaxial Cable	Woken	WC12	CC003	06/28/2019	06/27/2020
Power Meter	Anritsu	ML2495A	1149001	02/12/2019	02/11/2020
Power Seneor	Anritsu	MA2491A	030982	02/12/2019	02/11/2020
Signal Analyzer	R&S	FSV 40	101073	09/27/2018	09/26/2019
Software	N/A				
3M 966 Chamber Test Site					
Equipment	Manufacturer	Model	S/N	Cal Date	Cal Due
Band Reject Filters	MICRO TRONICS	BRM 50702	120	02/26/2019	02/25/2020
Bilog Antenna	Sunol Sciences	JB3	A030105	07/26/2019	07/25/2020
Cable	HUBER SUHNER	SUCOFLEX 104PEA	25157	02/26/2019	02/25/2020
Cable	HUBER SUHNER	SUCOFLEX 104PEA	20995	02/26/2019	02/25/2020
Digital Thermo-Hygro Meter	WISEWIND	1206	D07	01/30/2019	01/29/2020
Horn Antenna	ETS LINDGREN	3117	00143280	07/16/2019	07/15/2020
Loop Ant	COM-POWER	AL-130	121051	03/22/2019	03/21/2020
Pre-Amplifier	EMEC	EM330	060609	02/26/2019	02/25/2020
Pre-Amplifier	HP	8449B	3008A00965	02/26/2019	02/25/2020
PSA Series Spectrum Analyzer	Agilent	E4446A	MY46180323	05/29/2019	05/28/2020
Antenna Tower	CCS	CC-A-1F	N/A	N.C.R	N.C.R
Controller	CCS	CC-C-1F	N/A	N.C.R	N.C.R
Turn Table	CCS	CC-T-1F	N/A	N.C.R	N.C.R
Software	e3 6.11-20180413				
AC Conducted Emissions Test Site					
Equipment	Manufacturer	Model	S/N	Cal Date	Cal Due
N/A					

Remark: Each piece of equipment is scheduled for calibration once a year.



Report No.: T190715L03-RP

Page: 9 / 63
Rev.: 01

1.7 SUPPORT AND EUT ACCESSORIES EQUIPMENT

EUT Accessories Equipment					
No.	Equipment	Brand	Model	Series No.	FCC ID
	N/A				

Support Equipment					
No.	Equipment	Brand	Model	Series No.	FCC ID
1.	NB(D)	ASUS	A8J	N/A	PD9WM3945ABG
2.	DC Power Supply	AGILENT	E3640A	N/A	N/A

1.8 TEST METHODOLOGY AND APPLIED STANDARDS

The test methodology, setups and results comply with all requirements in accordance with ANSI C63.10:2013, FCC Part 2, FCC Part 15.247, KDB 558074 D01

.



Report No.: T190715L03-RP

Page: 10 / 63

Rev.: 01

2. TEST SUMMERY

FCC Standard Section	Report Section	Test Item	Result
15.203	1.3	Antenna Requirement	Pass
15.207(a)	4.1	AC Conducted Emission	N/A
15.247(a)(2)	4.2	6 dB Bandwidth	Pass
-	4.2	Occupied Bandwidth (99%)	Pass
15.247(b)(3)	4.3	Output Power Measurement	Pass
15.247(e)	4.4	Power Spectral Density	Pass
15.247(d)	4.5	Conducted Band Edge	Pass
15.247(d)	4.5	Conducted Spurious Emission	Pass
15.247(d)	4.6	Radiation Band Edge	Pass
15.247(d)	4.6	Radiation Spurious Emission	Pass



Report No.: T190715L03-RP

Page: 11 / 63
Rev.: 01

3. DESCRIPTION OF TEST MODES

3.1 THE WORST MODE OF OPERATING CONDITION

Operation mode	BT4.2 Mode (1Mbps) BT5.0 Mode (2Mbps)
Test Channel Frequencies	1.Lowest Channel : 2402MHz 2.Middle Channel : 2440MHz 3.Highest Channel : 2480MHz

Remark:

1. EUT pre-scanned data rate of output power for each mode, the worst data rate were recorded in this report.

.

3.2 THE WORST MODE OF MEASUREMENT

Radiated Emission Measurement Above 1G	
Test Condition	Band edge, Emission for Unwanted and Fundamental
Power supply Mode	Mode 1: EUT power by Power supply (DC 12V)
Worst Mode	☒ Mode 1 ☐ Mode 2 ☐ Mode 3 ☐ Mode 4
Worst Position	☐ Placed in fixed position. ☒ Placed in fixed position at X-Plane (E2-Plane) ☐ Placed in fixed position at Y-Plane (E1-Plane) ☐ Placed in fixed position at Z-Plane (H-Plane)

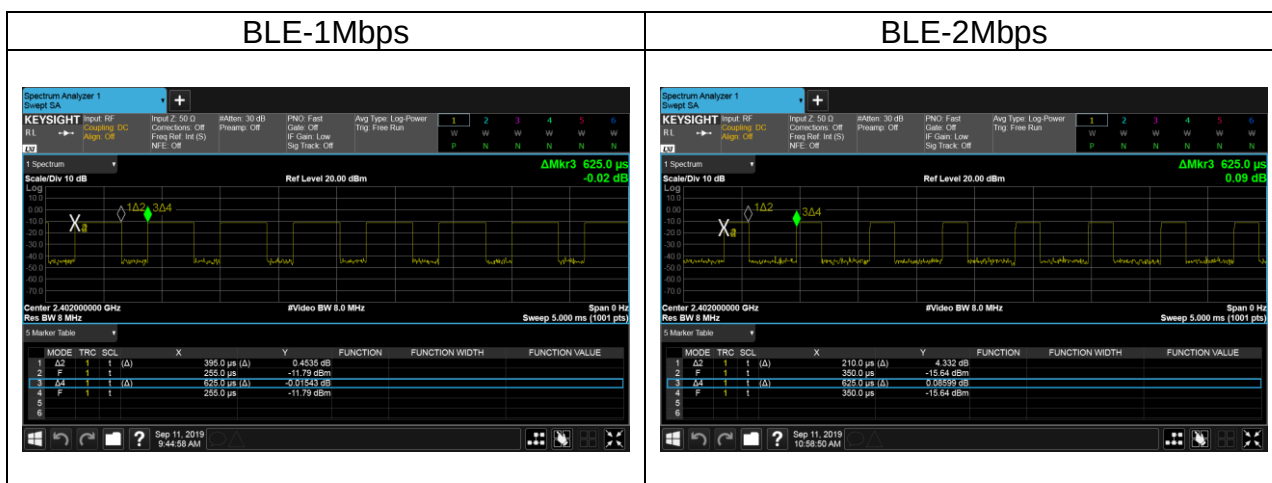
Radiated Emission Measurement Below 1G	
Test Condition	Radiated Emission Below 1G
Power supply Mode	Mode 1: EUT power by Power supply (DC 12V)
Worst Mode	☒ Mode 1 ☐ Mode 2 ☐ Mode 3 ☐ Mode 4

Remark:

1. The worst mode was record in this test report.
2. EUT pre-scanned in three axis, X, Y, Z and for radiated measurement. The worst case(X-Plane) were recorded in this report

3.3 EUT DUTY CYCLE

Duty Cycle			
Configuration	TX ON (ms)	TX ALL (ms)	Duty Cycle (%)
BLE-1Mbps	0.3950	0.6250	63.20%
BLE-2Mbps	0.2100	0.6250	33.60%



4. TEST RESULT

4.1 AC POWER LINE CONDUCTED EMISSION

4.1.1 Test Limit

According to §15.207(a),

Frequency Range (MHz)	Limits(dB μ V)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56*	56 to 46*
0.50 to 5	56	46
5 to 30	60	50

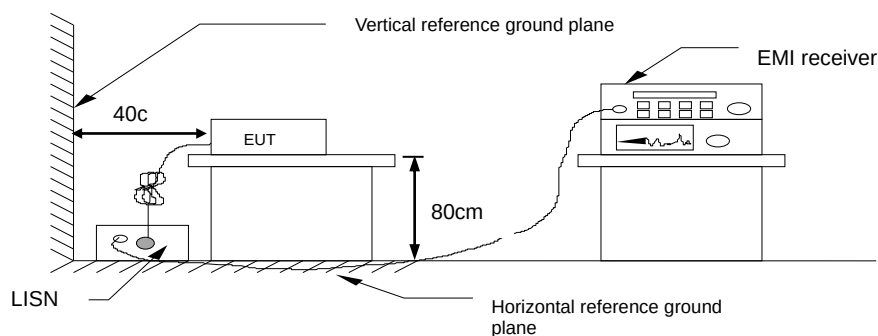
* Decreases with the logarithm of the frequency.

4.1.2 Test Procedure

Test method Refer as ANSI C63.10: 2013 clause 6.2,

1. The EUT was placed on a non-conducted table, which is 0.8m above horizontal ground plane and 0.4m above vertical ground plane.
2. EUT connected to the line impedance stabilization network (LISN)
3. Receiver set RBW of 9kHz and Detector Peak, and note as quasi-peak and average.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. Recorded Line for Neutral and Line.

4.1.3 Test Setup





Report No.: T190715L03-RP

Page: 15 / 63
Rev.: 01

4.1.4 Test Result

Not applicable, because EUT not connect to AC Main Source direct.

4.2 6dB BANDWIDTH AND OCCUPIED BANDWIDTH(99%)

4.2.1 Test Limit

According to §15.247(a)(2)

6 dB Bandwidth :

Limit	Shall be at least 500kHz
-------	--------------------------

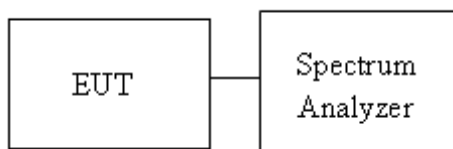
Occupied Bandwidth(99%) : For reporting purposes only.

4.2.2 Test Procedure

Test method Refer as KDB 558074 D01 and ANSI C63.10: 2013 clause 6.9.2.

1. The EUT RF output connected to the spectrum analyzer by RF cable.
2. Setting maximum power transmit of EUT
3. SA set RBW = 100KHz, VBW = 300KHz and Detector = Peak, to measurement 6dB Bandwidth.
4. SA set RBW = 1% ~ 5% OBW, VBW = three times the RBW and Detector = Peak, to measurement 99% Bandwidth.
5. Measure and record the result of 6 dB Bandwidth and 99% Bandwidth. in the test report.

4.2.3 Test Setup





Report No.: T190715L03-RP

Page: 17 / 63

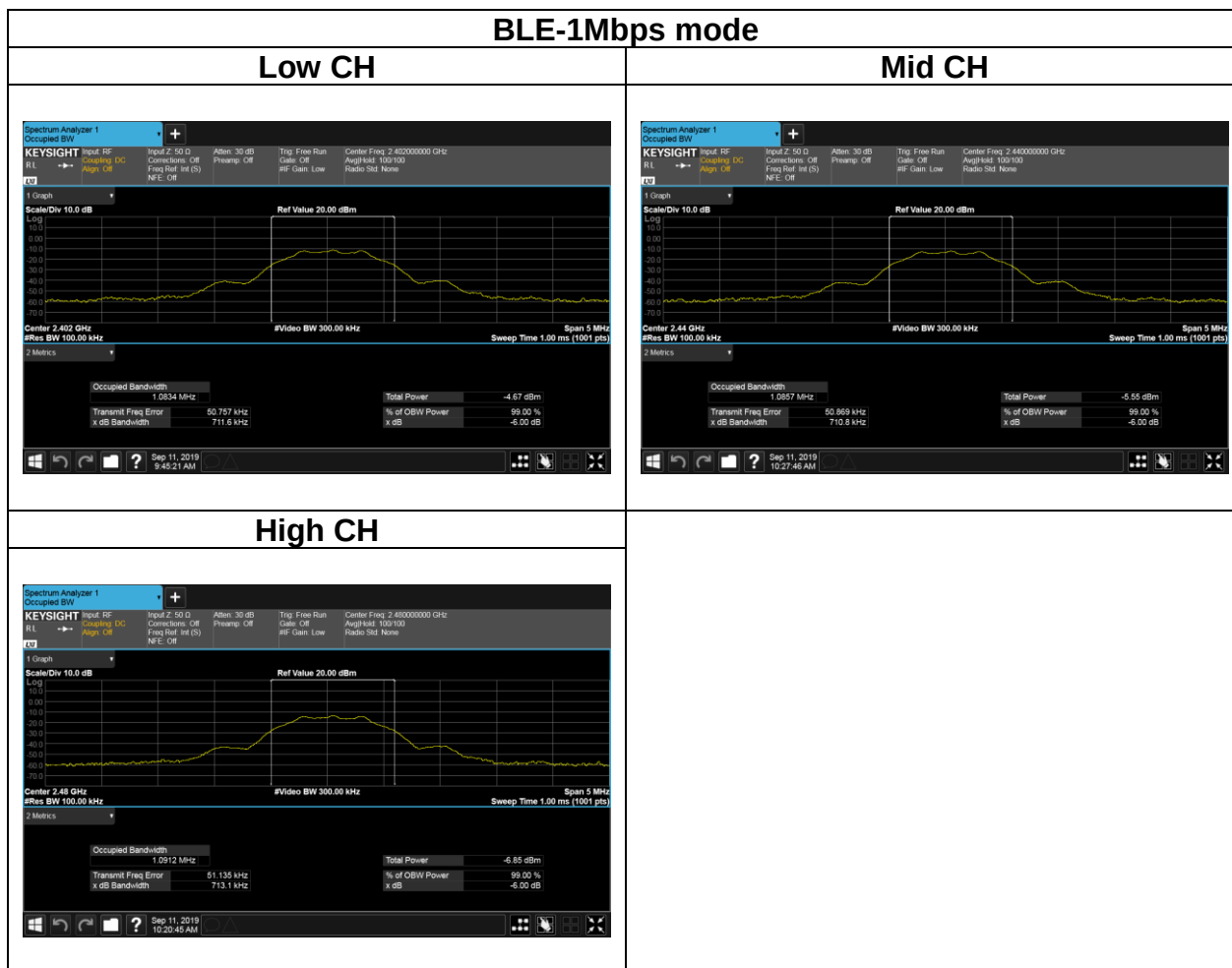
Rev.: 01

4.2.4 Test Result

Test mode: BLE-1Mbps mode / 2402-2480 MHz				
Channel	Frequency (MHz)	OBW (99%) (MHz)	6dB BW (MHz)	6dB limit (kHz)
Low	2402	1.0483	0.7116	>500
Mid	2440	1.0511	0.7108	
High	2480	1.0538	0.7131	

Test mode: BLE-2Mbps mode / 2402-2480 MHz				
Channel	Frequency (MHz)	OBW (99%) (MHz)	6dB BW (MHz)	6dB limit (kHz)
Low	2402	1.8386	1.155	>500
Mid	2440	1.8397	1.153	
High	2480	1.8418	1.157	

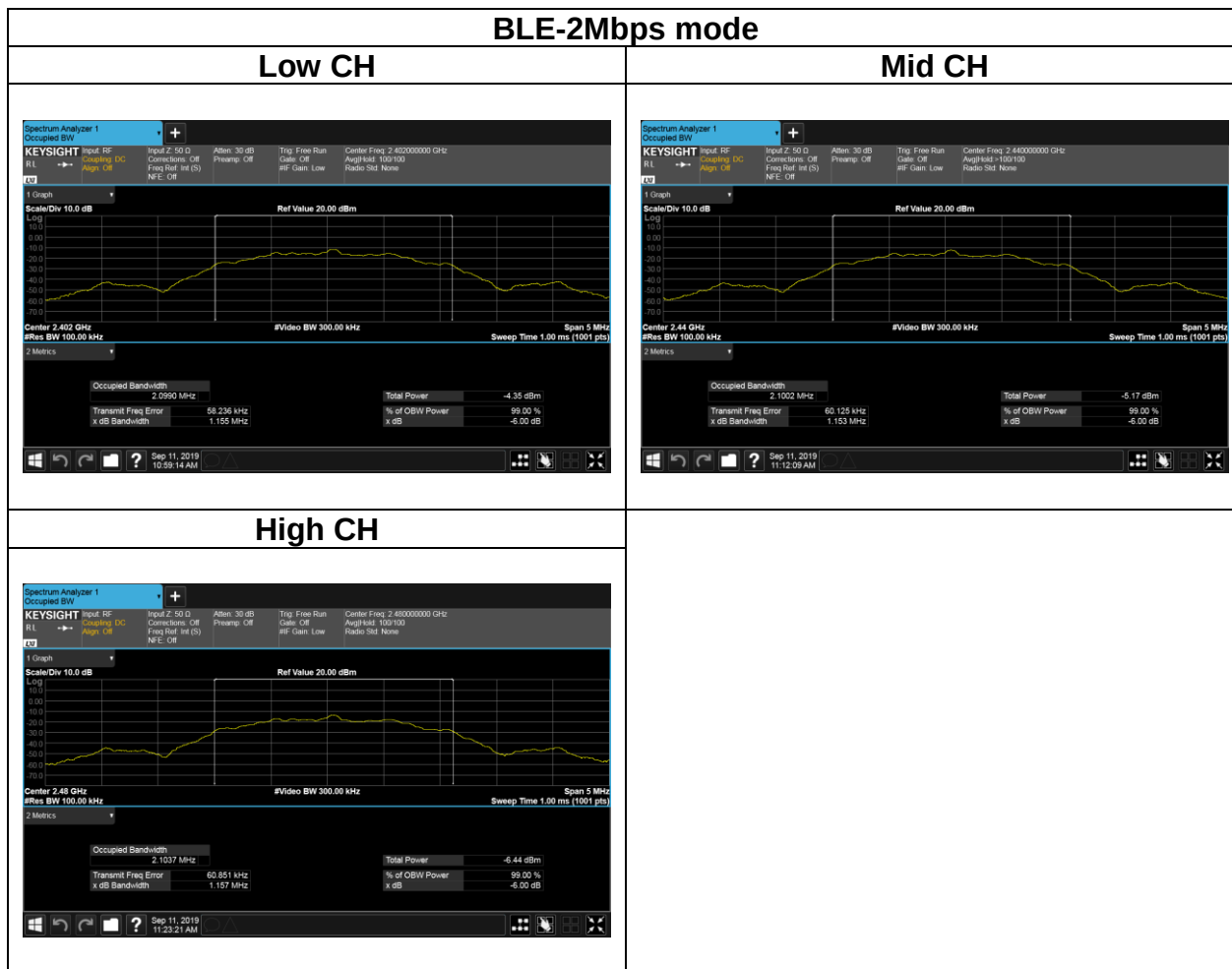
Test Data (6dB BANDWIDTH)





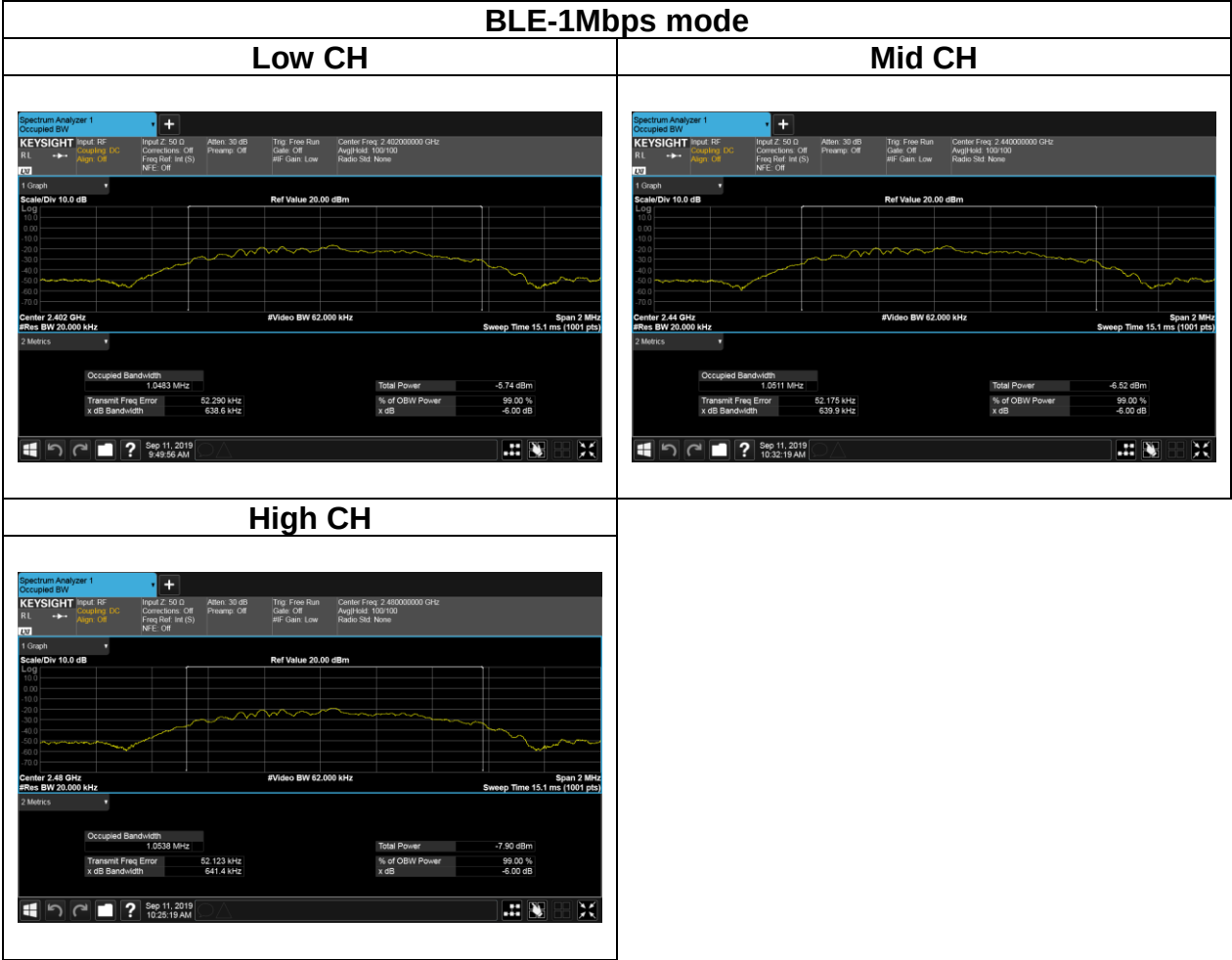
Report No.: T190715L03-RP

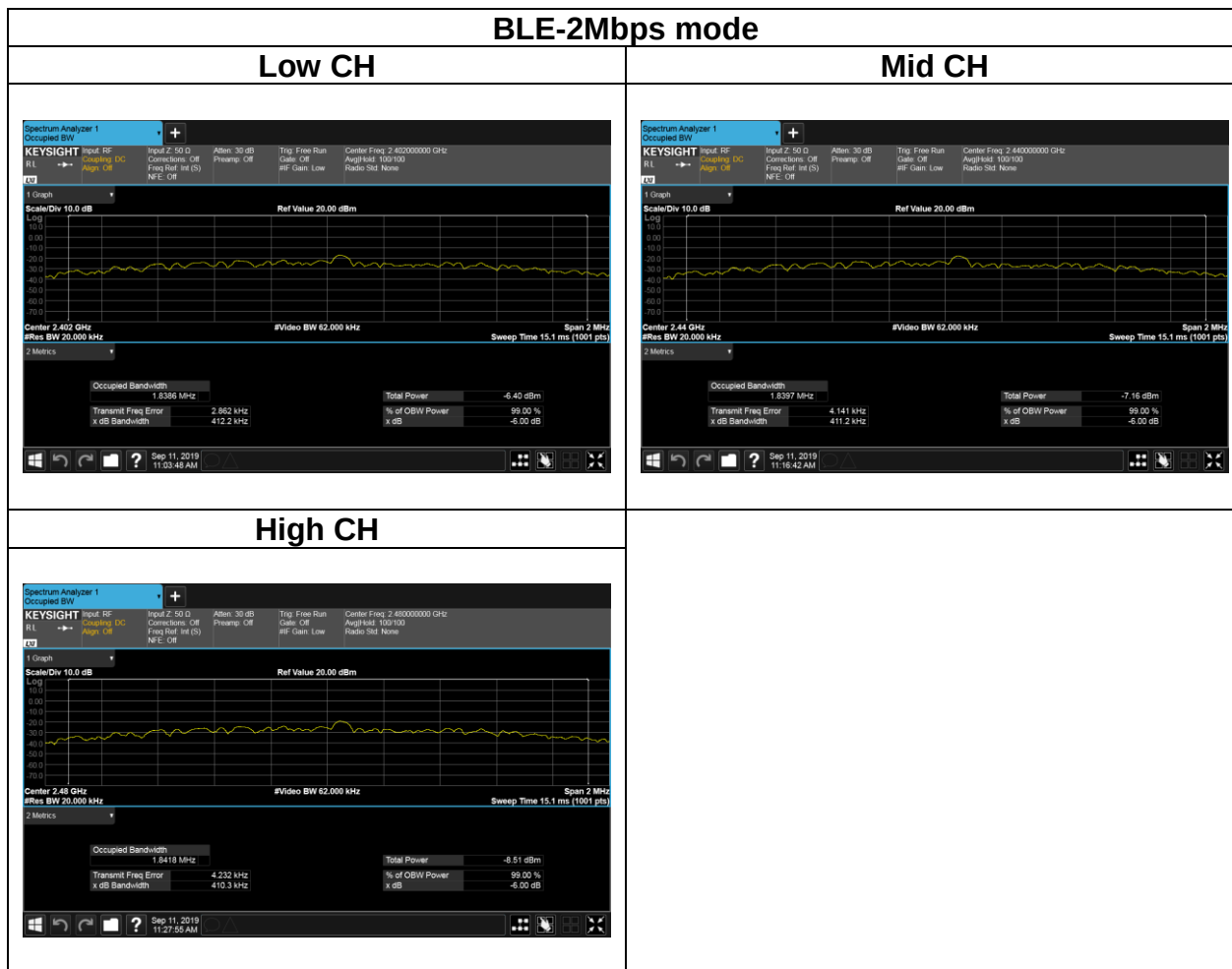
Page: 19 / 63
Rev.: 01



Report No.: T190715L03-RP

Test Data (BANDWIDTH 99%)





4.3 OUTPUT POWER MEASUREMENT

4.3.1 Test Limit

According to §15.247(b)(3)

Peak output power :

FCC

Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

Limit	☒ Antenna not exceed 6 dBi : 30dBm ☐ Antenna with DG greater than 6 dBi [Limit = 30 – (DG – 6)] ☐ Point-to-point operation
-------	---

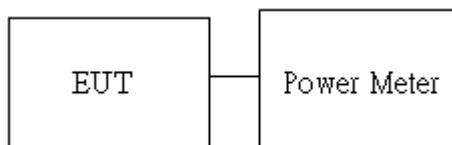
Average output power : For reporting purposes only.

4.3.2 Test Procedure

Test method Refer as KDB 558074 D01

1. The EUT RF output connected to the power meter by RF cable.
2. Setting maximum power transmit of EUT.
3. The path loss was compensated to the results for each measurement.
4. Measure and record the result of Peak output power and Average output power. in the test report.

4.3.3 Test Setup



4.3.4 Test Result

For Bluetooth 4.2

Peak output power :

BLE Mode						
Config.	CH	Freq. (MHz)	Power setting	PK Power (dBm)	PK Power (W)	Limit (dBm)
BLE Data rate: 1Mbps	0	2402	Default	-0.08	0.0010	30
	19	2440	Default	-0.48	0.0009	
	39	2480	Default	-0.98	0.0008	

Average output power :

BLE Mode			
Config.	CH	Freq. (MHz)	AV Power (dBm)
BLE Data rate: 1Mbps	0	2402	-0.91
	19	2440	-1.76
	39	2480	-2.91



Report No.: T190715L03-RP

Page: 24 / 63

Rev.: 01

For Bluetooth 5.0

Peak output power :

BLE Mode						
Config.	CH	Freq. (MHz)	Power setting	PK Power (dBm)	PK Power (W)	Limit (dBm)
BLE Data rate: 2Mbps	0	2402	Default	0.01	0.0010	30
	19	2440	Default	-0.93	0.0008	
	39	2480	Default	-1.10	0.0008	

Average output power :

BLE Mode			
Config.	CH	Freq. (MHz)	AV Power (dBm)
BLE Data rate: 2Mbps	0	2402	-0.90
	19	2440	-1.79
	39	2480	-2.90

4.4 POWER SPECTRAL DENSITY

4.4.1 Test Limit

According to §15.247(e)

For digitally modulated systems, 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.

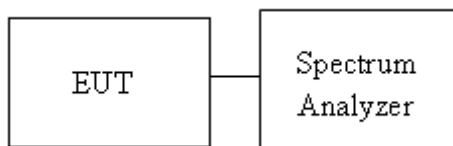
Limit	☒ Antenna not exceed 6 dBi : 8dBm ☐ Antenna with DG greater than 6 dBi [Limit = 8 – (DG – 6)] ☐ Point-to-point operation :
-------	---

4.4.2 Test Procedure

Test method Refer as KDB 558074 D01

1. The EUT RF output connected to the spectrum analyzer by RF cable.
2. Setting maximum power transmit of EUT
3. SA set RBW = 3kHz, VBW = 30kHz, Span = 1.5 times DTS Bandwidth (6 dB BW), Detector = Peak, Sweep Time = Auto and Trace = Max hold.
4. The path loss was compensated to the results for each measurement by SA.
5. Mark the maximum level.
6. Measure and record the result of power spectral density. in the test report.

4.4.3 Test Setup





Report No.: T190715L03-RP

Page: 26 / 63

Rev.: 01

4.4.4 Test Result

Test mode: BLE-1Mbps mode / 2402-2480 MHz			
Channel	Frequency (MHz)	PSD (dBm)	limit (dBm)
Low	2402	-16.46	8
Mid	2440	-17.02	
High	2480	-18.52	

Test mode: BLE-2Mbps mode / 2402-2480 MHz			
Channel	Frequency (MHz)	PSD (dBm)	limit (dBm)
Low	2402	-18.81	8
Mid	2440	-19.53	
High	2480	-20.98	



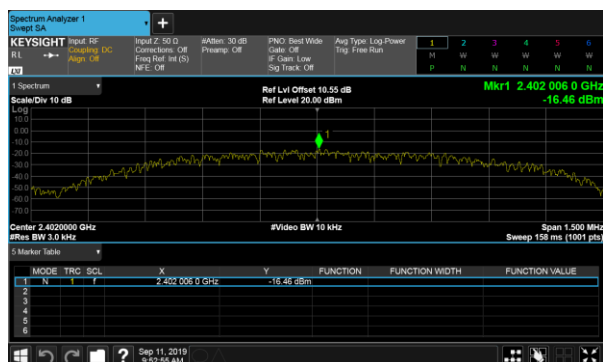
Report No.: T190715L03-RP

Page: 27 / 63
Rev.: 01

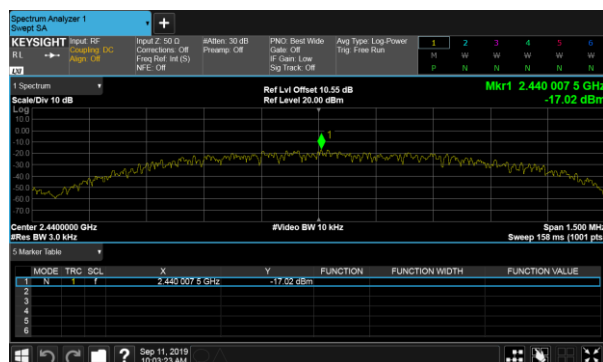
Test Data

BLE-1Mbps mode

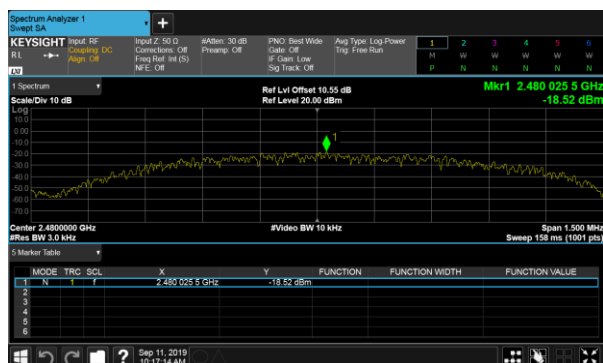
Low CH



Mid CH



High CH



Low CH



Spectrum Analyzer 1
 Direct SA

KEYSIGHT Input RF: 2.500 GHz, Correction Off, Freq Ref Int (S): NFE, Off, Attenu: 30.0 dB, Preamp: 30.0 dB, PNC: Best Wide, Gate: Off, Avg Type: Log Power, Trg: Free Run

1	2	3	4	5	6
P	N	W	W	W	W
P	N	W	W	W	W

Ref Lvl Offset 10.55 dB
 Ref Level 20.00 dBm

Scale: Div 10 dB
 Log
 10.0
 20.0
 30.0
 40.0
 50.0
 60.0
 70.0

Center 2.4400000 GHz
 Span 1.500 MHz
 Sweep 158 ms (1001 pts)

#Video BW 10 kHz
 Sweep 158 ms (1001 pts)

5 Marker Table

MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	2.440 043 5 GHz	-19.53 dBm			
2							
3							
4							
5							

Sep 11, 2019
 11:08:48 AM

Spectrum Analyzer 1
Sweep SA

KEYSIGHT Input RF
RL **Power** **RF**
Align Ch

Input 2: 50 Ω
Corrections Off
Freq Ref Int (S)
NFE: Off

Attenu: 30 dB
Preamp: Off

PNO: Best Wide
Gate: Off
IF Gain: Low
Sig Track: Off

Aug Type: Log-Power
Trig: Free Run

1	2	3	4	5	6
M	W	W	W	W	W
P	N	N	N	N	N

1 Spectrum
Scale/Div 10 dB
Log
Center 2.4800000 GHz
#Res BW 3.0 kHz
5 Marker Table

Ref Lvl Offset 10.55 dB
Ref Level 20.00 dBm

Mkr1 2.480 045 0 GHz
-20.95 dBm

#Video BW 10 kHz
Span 1.500 MHz
Sweep 158 ms (1001 pts)

MODE	TRG	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N		2.480 045 0 GHz	-20.95 dBm			
2							
3							
4							
5							
6							

Sep 11, 2019
11:28:34 AM

4.5 CONDUCTED BAND EDGE AND SPURIOUS EMISSION

4.5.1 Test Limit

According to §15.247(d)

FCC: In any 100 kHz bandwidth outside the authorized frequency band,

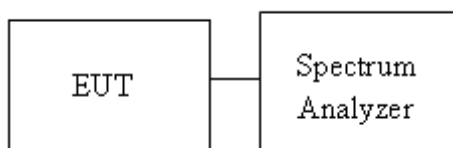
Non-restricted bands shall be attenuated at least 20 dB/30 dB relative to the maximum PSD level in 100 kHz by RF conducted or a radiated measurement which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a).

4.5.2 Test Procedure

Test method Refer as KDB 558074 D01

1. EUT RF output port connected to the SA by RF cable, and the path loss was compensated to result.
2. SA setting, RBW=100kHz, VBW=300kHz, Detector=Peak, Trace mode = max hold, SWT = Auto.
3. In any 100 kHz bandwidth outside the authorized frequency band, shall be attenuated at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz when conducted power procedure is used. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

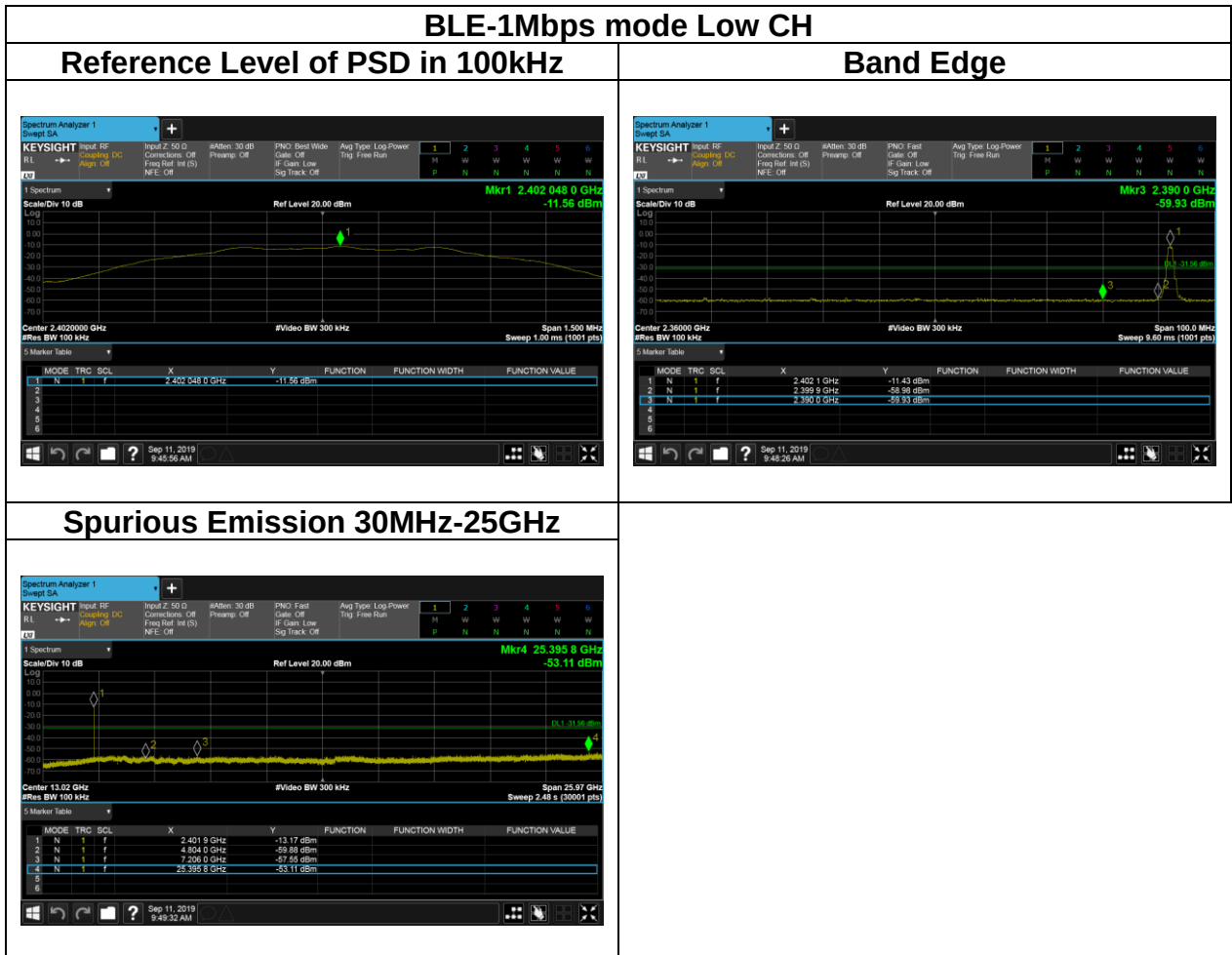
4.5.3 Test Setup

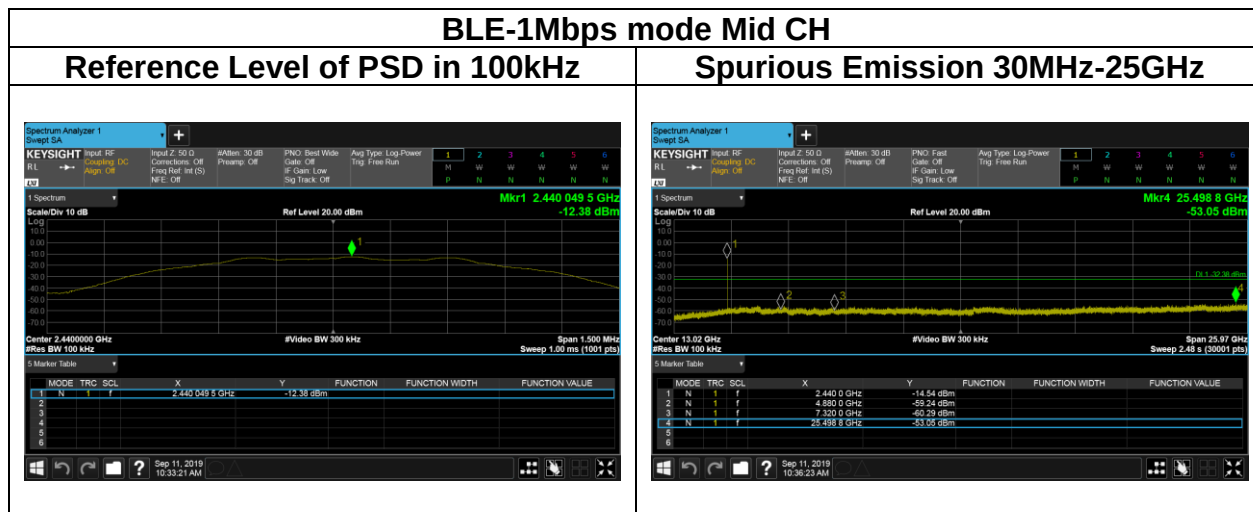


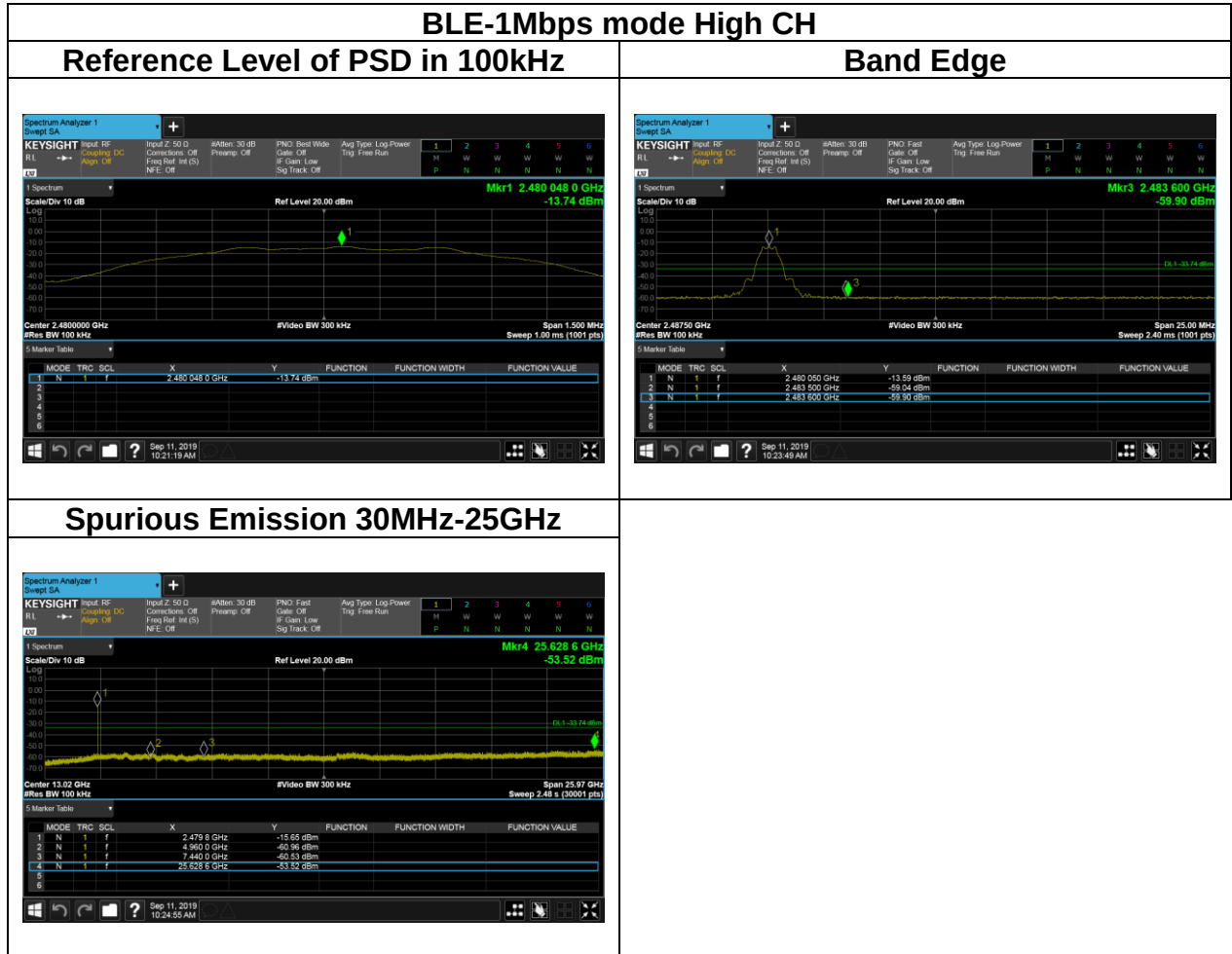
Report No.: T190715L03-RP

4.5.4 Test Result

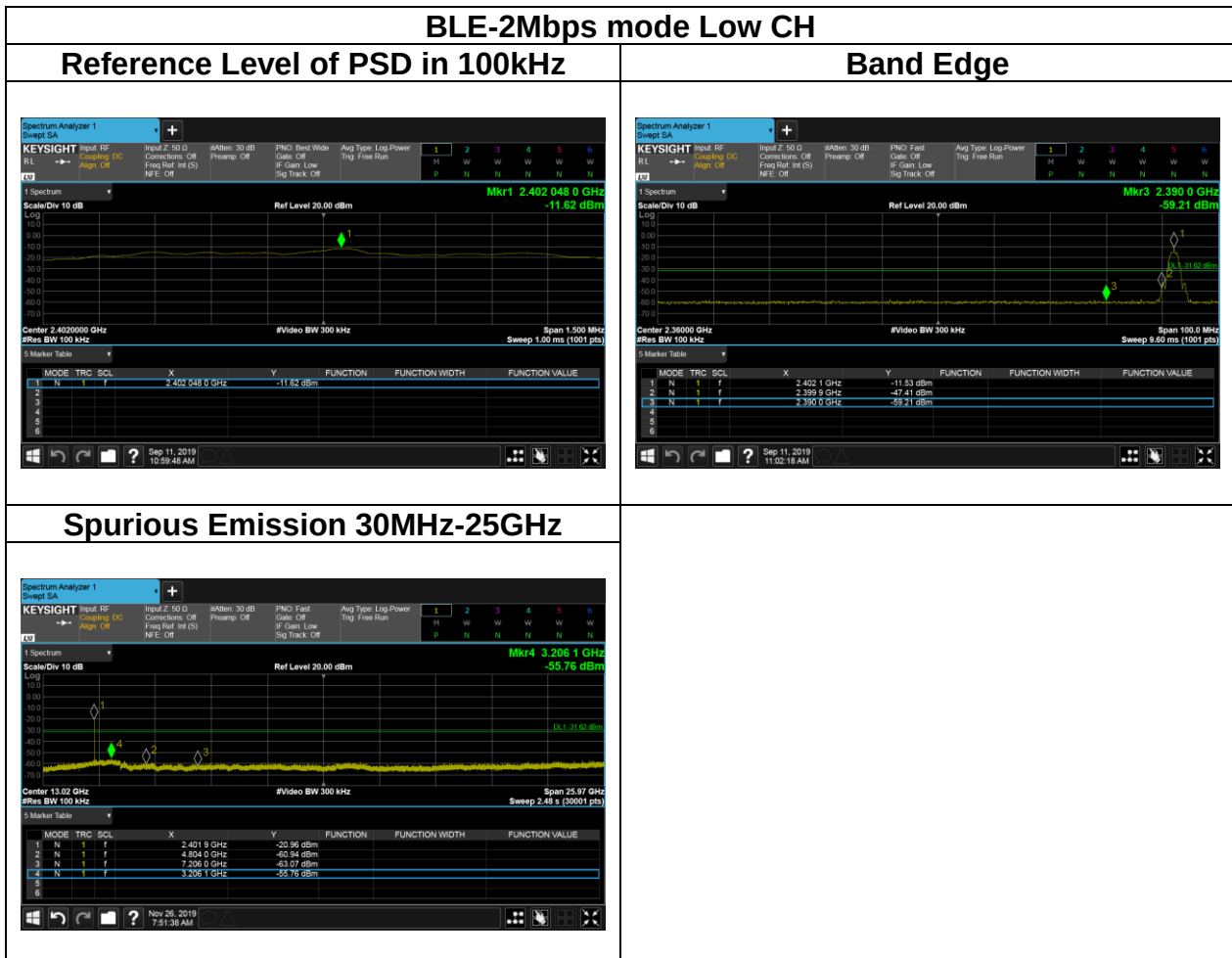
Test Data

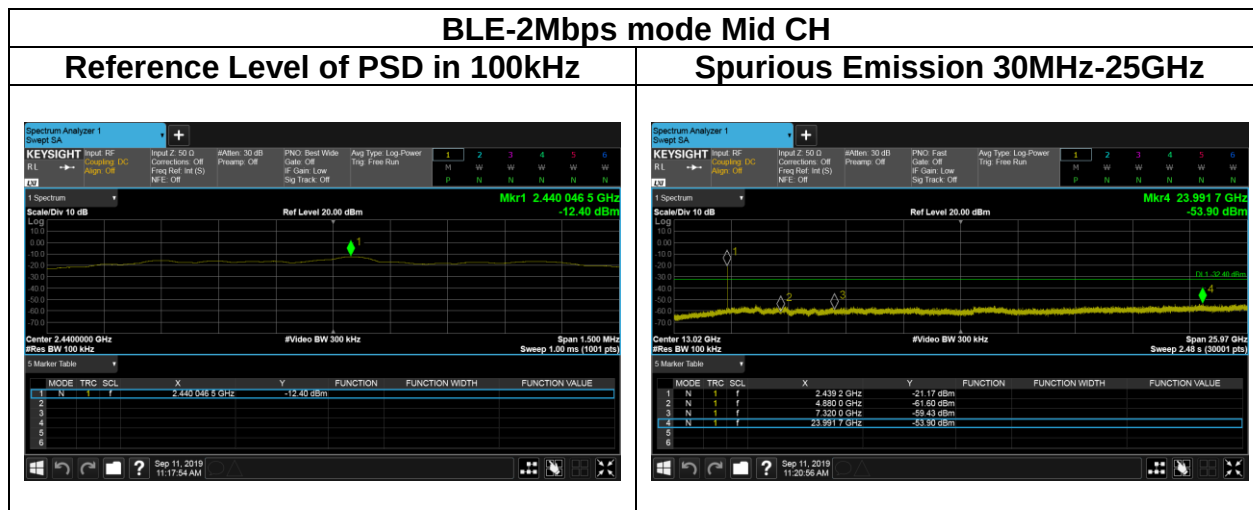


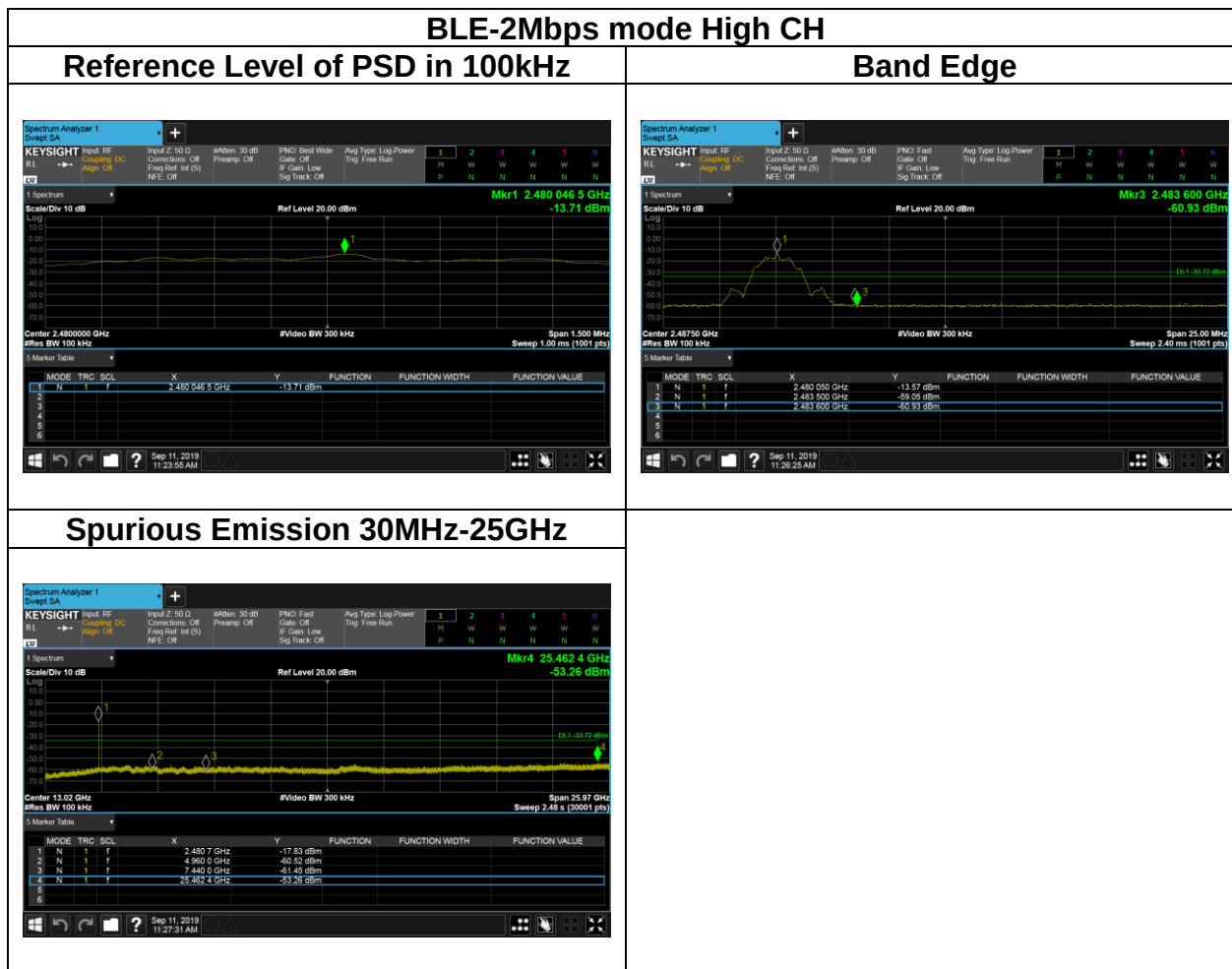




Test Data







4.6 RADIATION BANDEDGE AND SPURIOUS EMISSION

4.6.1 Test Limit

FCC according to §15.247(d), §15.209 and §15.205,

In any 100 kHz bandwidth outside the authorized frequency band, all harmonic and spurious must be least 20 dB below the highest emission level with the authorized frequency band. Radiation emission which fall in the restricted bands must also follow the FCC section 15.209 as below limit in table.

Below 30 MHz

Frequency	Field Strength (microvolts/m)	Magnetic H-Field (microamperes/m)	Measurement Distance (metres)
9-490 kHz	2,400/F (F in kHz)	2,400/F (F in kHz)	300
490-1,705 kHz	24,000/F (F in kHz)	24,000/F (F in kHz)	30
1.705-30 MHz	30	N/A	30

Above 30 MHz

Frequency (MHz)	Field Strength microvolts/m at 3 metres (watts, e.i.r.p.)	
	Transmitters	Receivers
30-88	100 (3 nW)	100 (3 nW)
88-216	150 (6.8 nW)	150 (6.8 nW)
216-960	200 (12 nW)	200 (12 nW)
Above 960	500 (75 nW)	500 (75 nW)

Remark:

Although these tests were performed other than open area test site, adequate comparison measurements were confirmed against 30 m open area test site. Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 414788.

4.6.2 Test Procedure

Test method Refer as KDB 558074 D01

1. The EUT is placed on a turntable, Above 1 GHz is 1.5m and below 1 GHz is 0.8m above ground plane. The EUT Configured un accordance with ANSI C63.10, and the EUT set in a continuous mode.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level. And EUT is set 3m away from the receiving antenna, which is scanned from 1m to 4m above the ground plane to find out the highest emissions. Measurement are made polarized in both the vertical and the horizontal positions with antenna.
3. Span shall wide enough to full capture the emission measured. The SA from 9KHz to 26.5GHz set to the low, Mid and High channels with the EUT transmit.
4. No emission found between lowest internal used/generated frequency to 30MHz (9KHz~30MHz)

Remark:

Although these tests were performed other than open area test site, adequate comparison measurements were confirmed against 30 m open are test site. Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 414788.

5. The SA setting following :

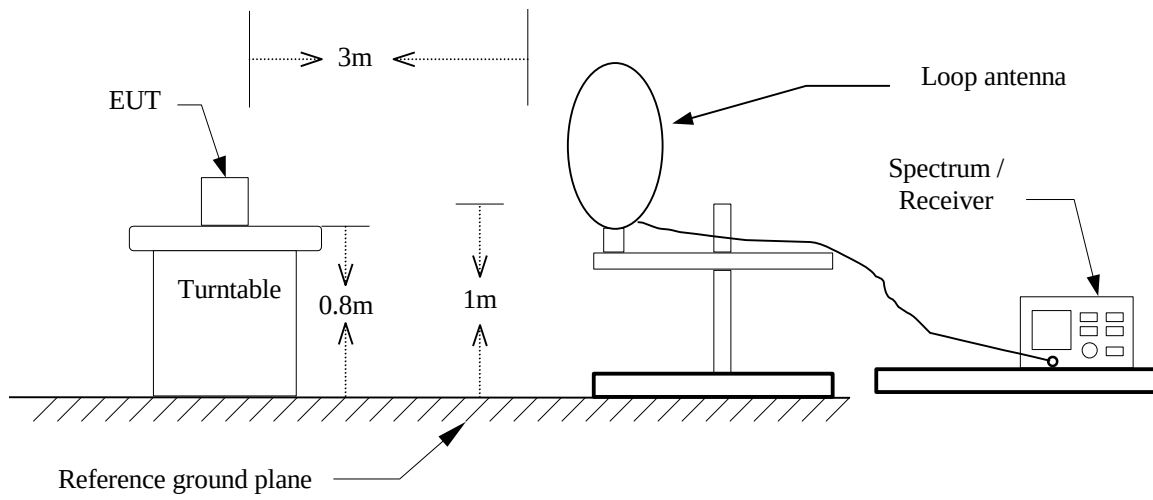
- (1) Below 1G : RBW = 100kHz, VBW $\geq$ 3 RBW, Sweep = Auto, Detector = Peak, Trace = Max hold.
- (2) Above 1G :
 - (2.1) For Peak measurement : RBW = 1MHz, VBW $\geq$ 3 RBW, Sweep = Auto, Detector = Peak, Trace = Max hold.
 - (2.2) For Average measurement : RBW = 1MHz, VBW
 - *If Duty Cycle $\geq$ 98%, VBW=10Hz.
 - *If Duty Cycle < 98%, VBW=1/T.

Configuration	Duty Cycle (%)	T(ms)	1/T (kHz)	VBW Setting
BLE-1Mbps	63.20%	0.3950	2.532	2.7K
BLE-2Mbps	33.60%	0.2100	4.762	5.1K

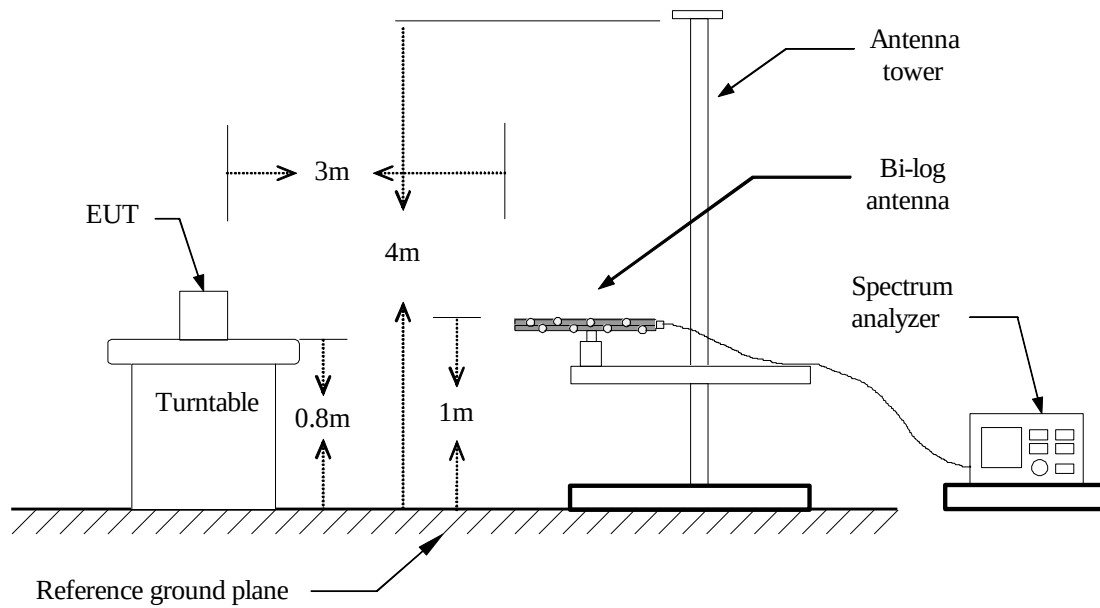
Report No.: T190715L03-RP

4.6.3 Test Setup

9kHz ~ 30MHz



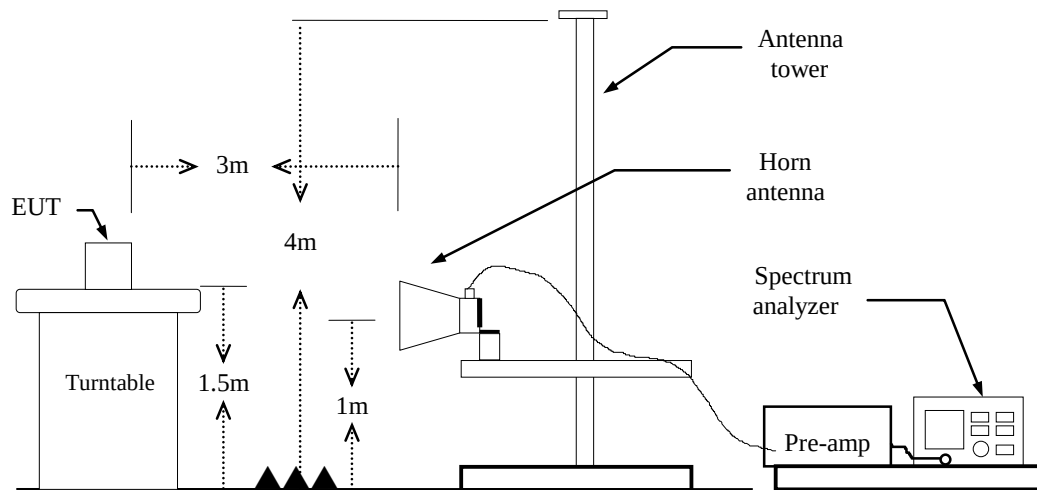
30MHz ~ 1GHz



Report No.: T190715L03-RP

Page: 39 / 63
Rev.: 01

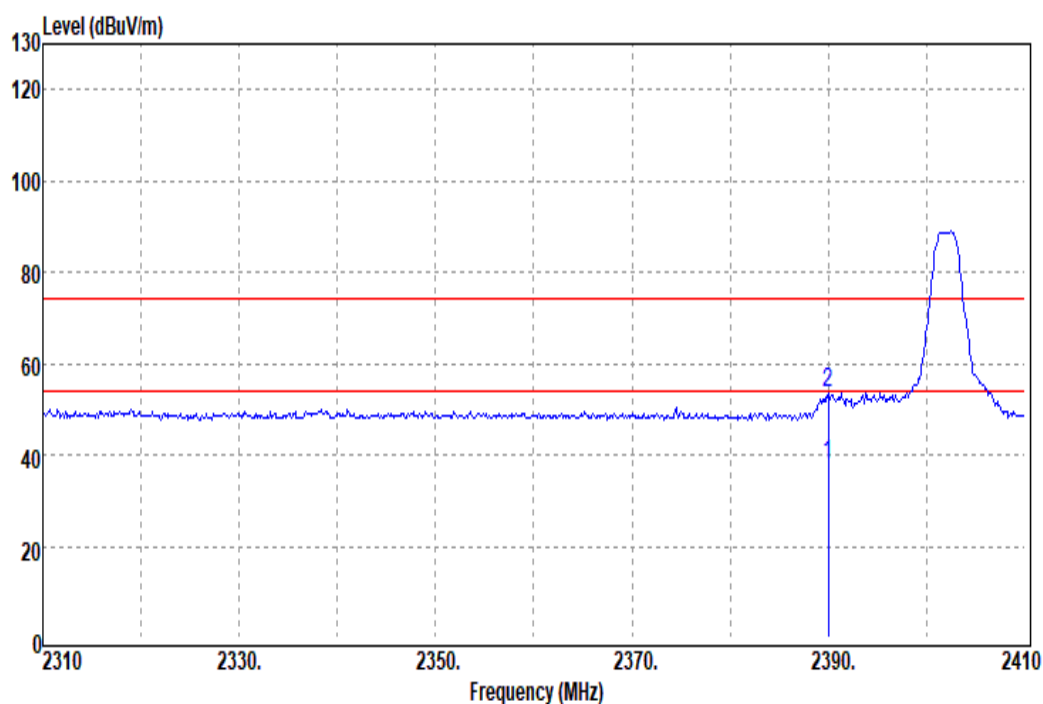
Above 1 GHz



4.6.4 Test Result

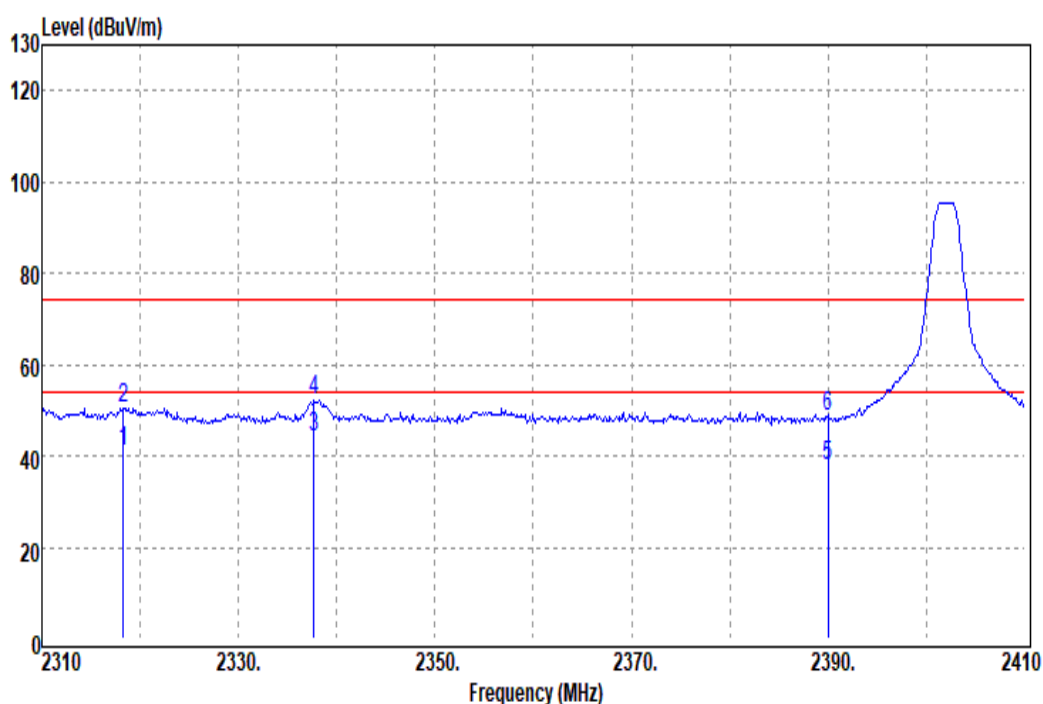
Band Edge Test Data

Test Mode:	BLE-1Mbps Low CH	Temp/Hum	26.1(°C)/ 52%RH
Test Item	Band Edge	Test Date	September 10, 2019
Polarize	Vertical	Test Engineer	Jerry Lu
Detector	Peak / Average		



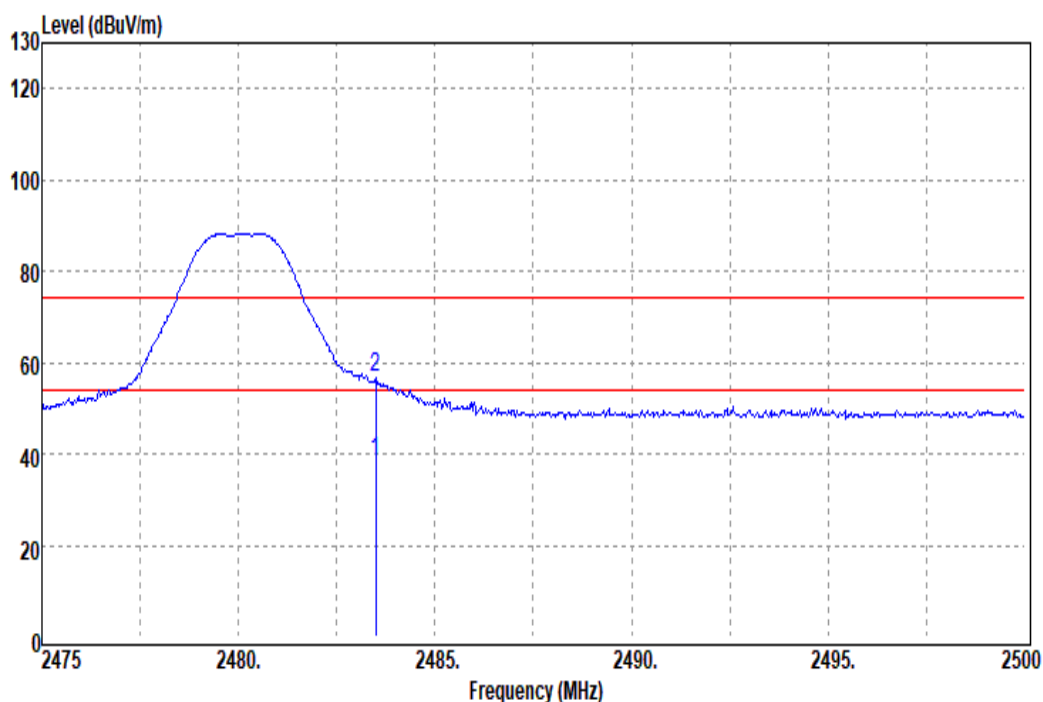
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2390.00	41.14	-3.38	37.76	54.00	-16.24	Average
2	2390.00	56.68	-3.38	53.30	74.00	-20.70	Peak

Test Mode:	BLE-1Mbps Low CH	Temp/Hum	26.1(°C)/ 52%RH
Test Item	Band Edge	Test Date	September 10, 2019
Polarize	Horizontal	Test Engineer	Jerry Lu
Detector	Peak / Average		



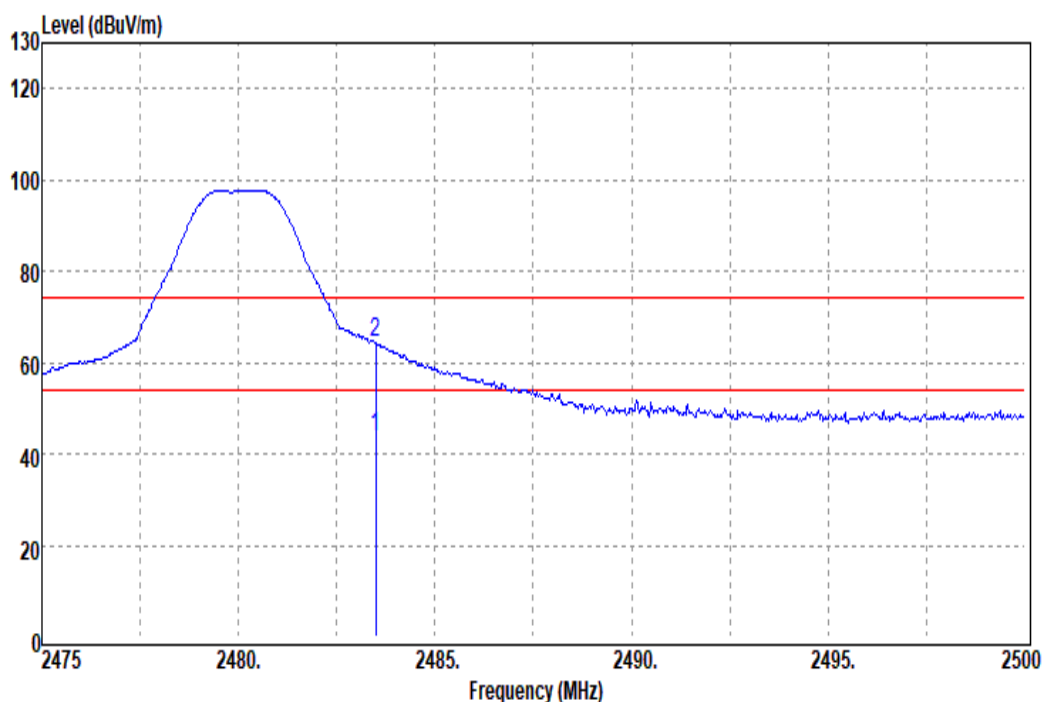
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2318.30	44.16	-3.26	40.90	54.00	-13.10	Average
2	2318.30	53.78	-3.26	50.52	74.00	-23.48	Peak
3	2337.70	47.26	-3.29	43.97	54.00	-10.03	Average
4	2337.70	55.32	-3.29	52.03	74.00	-21.97	Peak
5	2390.00	41.04	-3.38	37.66	54.00	-16.34	Average
6	2390.00	51.93	-3.38	48.55	74.00	-25.45	Peak

Test Mode:	BLE-1Mbps High CH	Temp/Hum	26.1(°C)/ 52%RH
Test Item	Band Edge	Test Date	September 10, 2019
Polarize	Vertical	Test Engineer	Jerry Lu
Detector	Peak / Average		



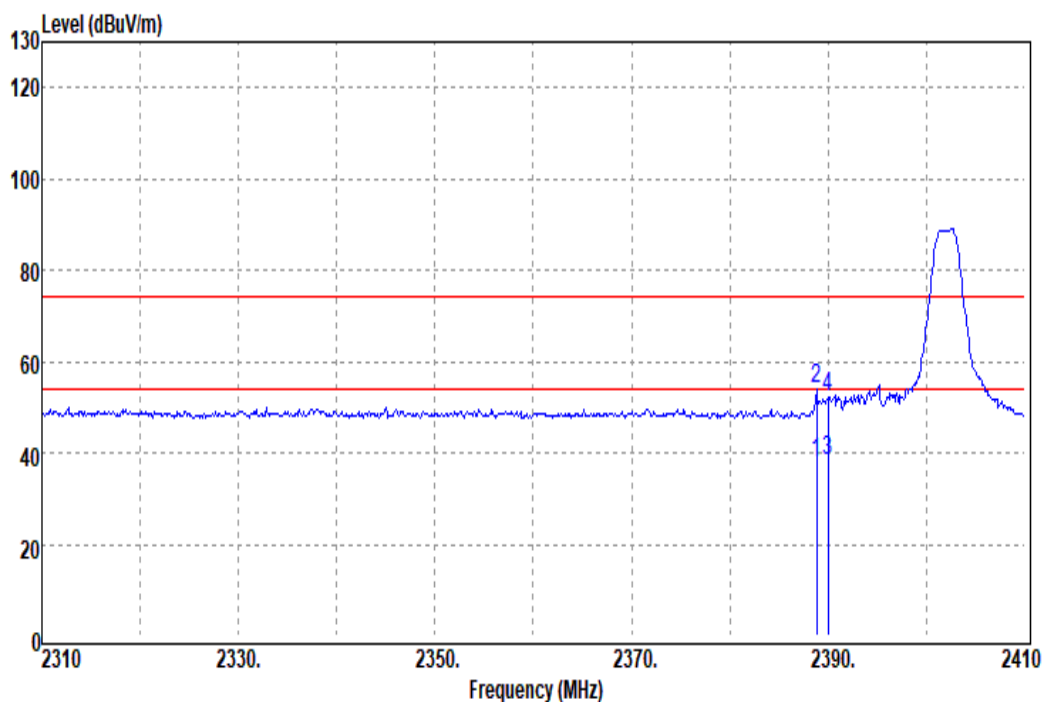
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	2483.50	41.13	-2.83	38.30	54.00	-15.70	Average
2	2483.50	59.29	-2.83	56.46	74.00	-17.54	Peak

Test Mode:	BLE-1Mbps High CH	Temp/Hum	26.1(°C)/ 52%RH
Test Item	Band Edge	Test Date	September 10, 2019
Polarize	Horizontal	Test Engineer	Jerry Lu
Detector	Peak / Average		



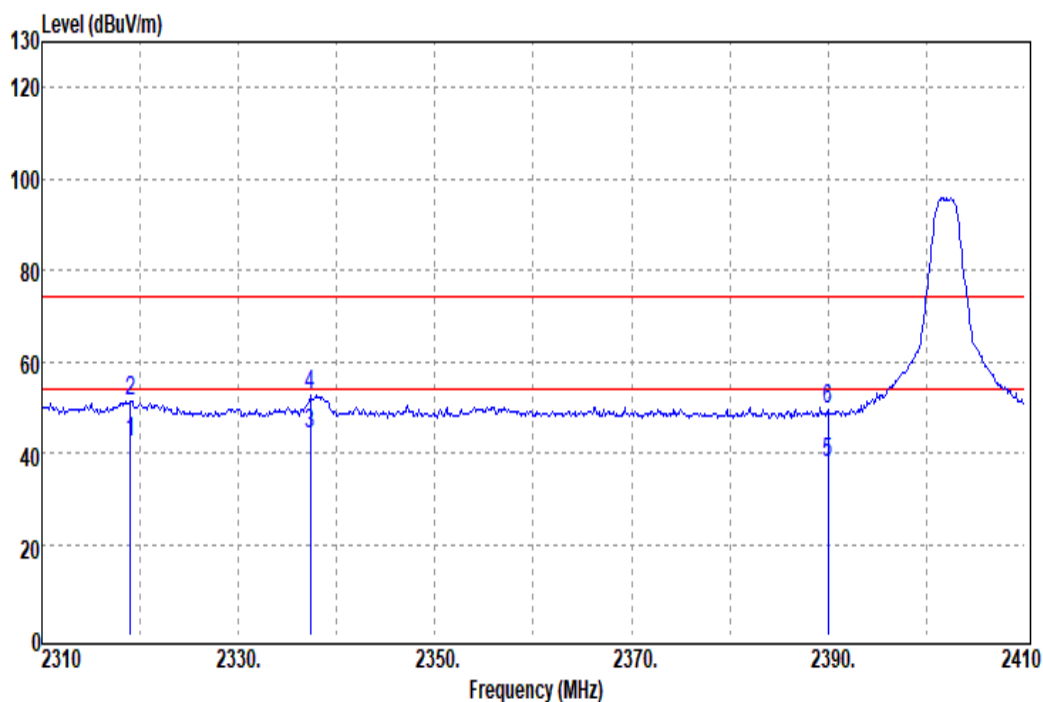
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.50	46.60	-2.83	43.77	54.00	-10.23	Average
2	2483.50	67.04	-2.83	64.21	74.00	-9.79	Peak

Test Mode:	BLE-2Mbps Low CH	Temp/Hum	26.1(°C)/ 52%RH
Test Item	Band Edge	Test Date	September 10, 2019
Polarize	Vertical	Test Engineer	Jerry Lu
Detector	Peak / Average		



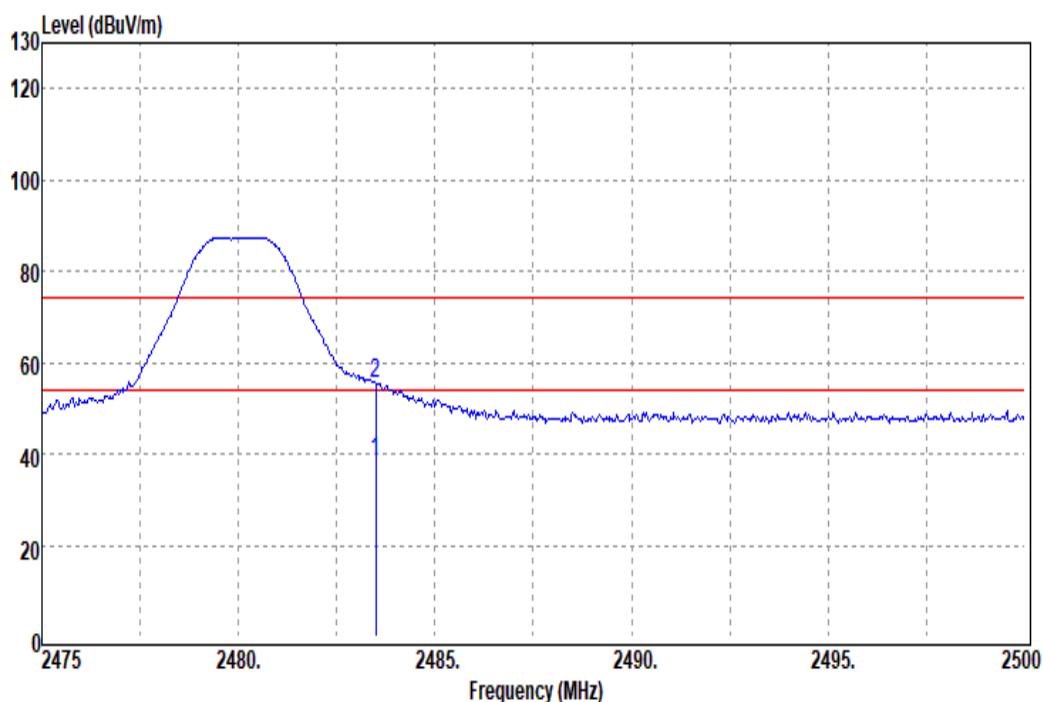
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2388.80	41.13	-3.39	37.74	54.00	-16.26	Average
2	2388.80	57.20	-3.39	53.81	74.00	-20.19	Peak
3	2390.00	41.77	-3.38	38.39	54.00	-15.61	Average
4	2390.00	55.48	-3.38	52.10	74.00	-21.90	Peak

Test Mode:	BLE-2Mbps Low CH	Temp/Hum	26.1(°C)/ 52%RH
Test Item	Band Edge	Test Date	September 10, 2019
Polarize	Horizontal	Test Engineer	Jerry Lu
Detector	Peak / Average		



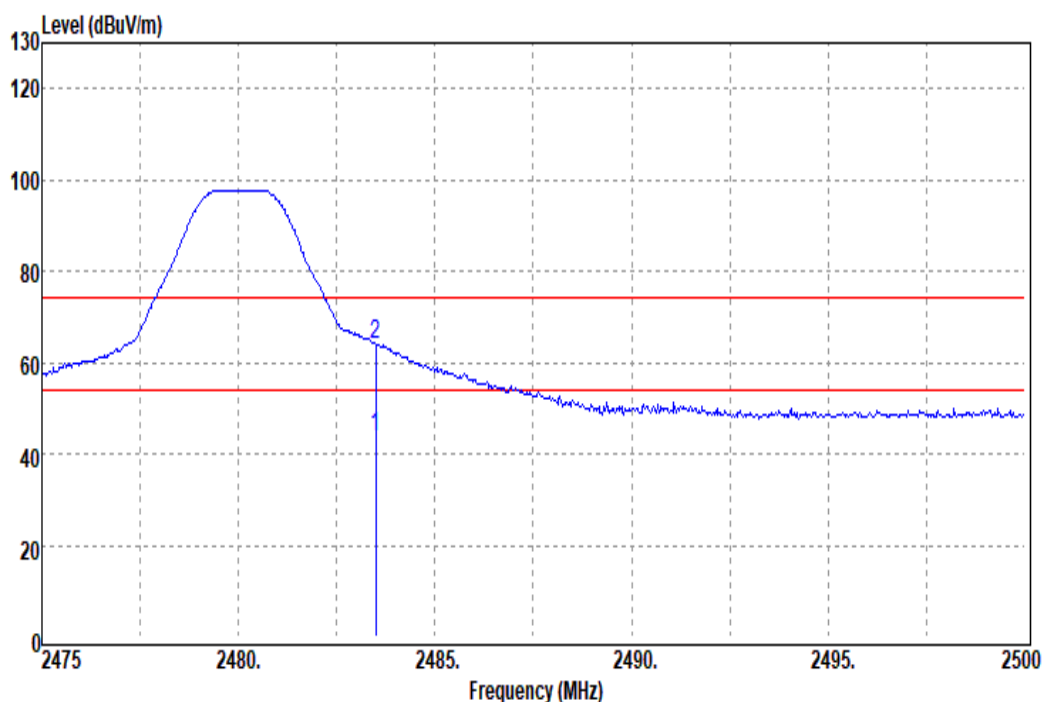
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2319.00	45.35	-3.25	42.10	54.00	-11.90	Average
2	2319.00	54.62	-3.25	51.37	74.00	-22.63	Peak
3	2337.30	47.55	-3.28	44.27	54.00	-9.73	Average
4	2337.30	55.99	-3.28	52.71	74.00	-21.29	Peak
5	2390.00	41.01	-3.38	37.63	54.00	-16.37	Average
6	2390.00	53.06	-3.38	49.68	74.00	-24.32	Peak

Test Mode:	BLE-2Mbps High CH	Temp/Hum	26.1(°C)/ 52%RH
Test Item	Band Edge	Test Date	September 10, 2019
Polarize	Vertical	Test Engineer	Jerry Lu
Detector	Peak / Average		



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	2483.50	41.05	-2.83	38.22	54.00	-15.78	Average
2	2483.50	58.20	-2.83	55.37	74.00	-18.63	Peak

Test Mode:	BLE-2Mbps High CH	Temp/Hum	26.1(°C)/ 52%RH
Test Item	Band Edge	Test Date	September 10, 2019
Polarize	Horizontal	Test Engineer	Jerry Lu
Detector	Peak / Average		

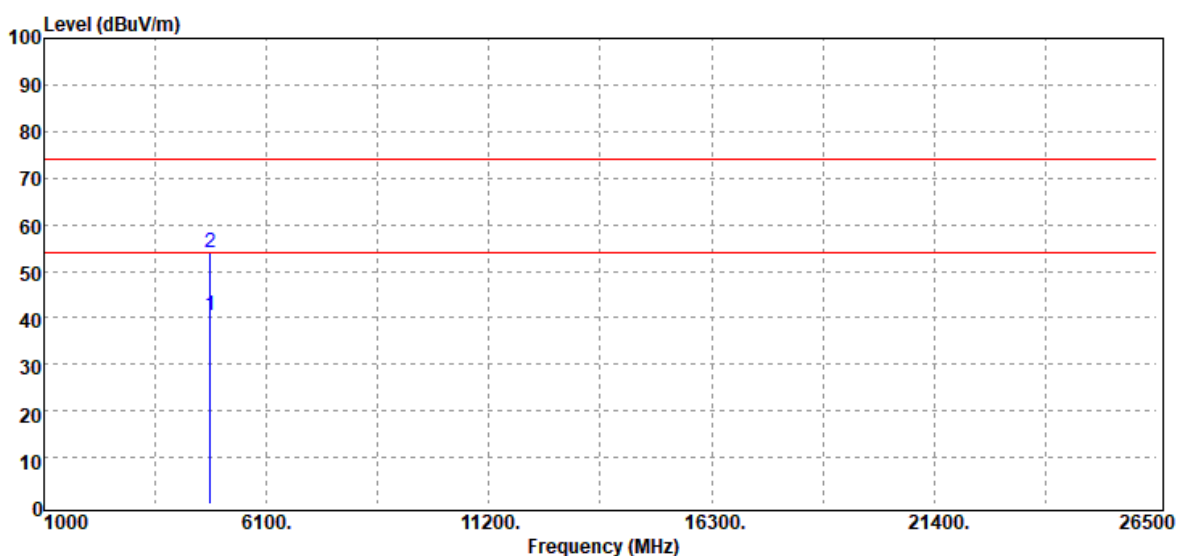


No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.50	46.35	-2.83	43.52	54.00	-10.48	Average
2	2483.50	66.91	-2.83	64.08	74.00	-9.92	Peak

Above 1G Test Data

For Bluetooth 4.2

Test Mode:	BLE-1Mbps Low CH	Temp/Hum	26.1(°C)/ 52%RH
Test Item	Harmonic	Test Date	September 10, 2019
Polarize	Vertical	Test Engineer	Jerry Lu
Detector	Peak and Average		

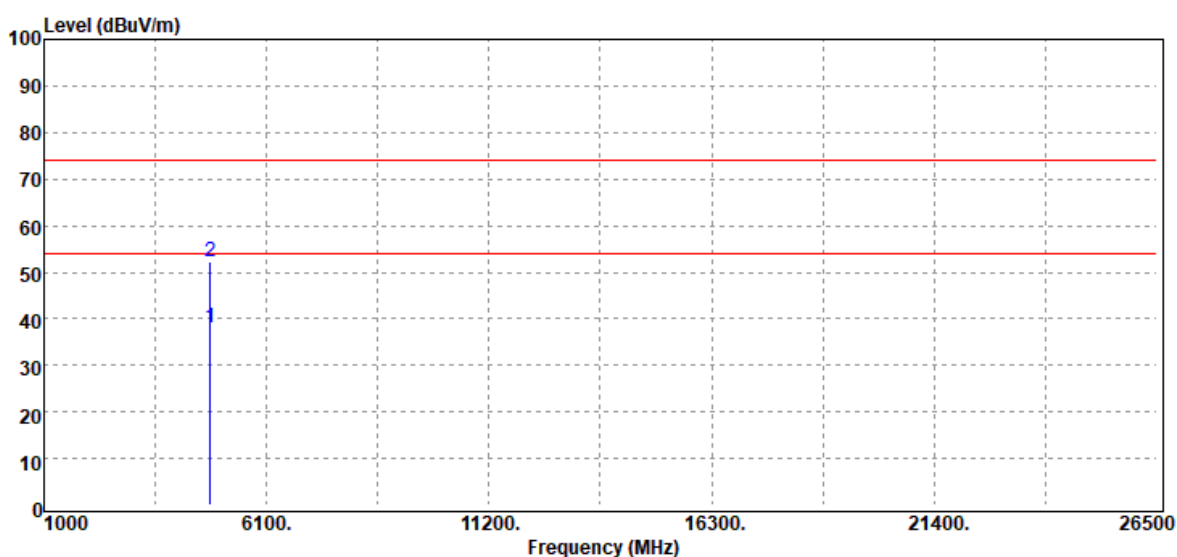


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4804.00	37.59	3.05	40.64	54.00	-13.36	Average
4804.00	50.99	3.05	54.04	74.00	-19.96	Peak
N/A						

Remark:

- Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

Test Mode:	BLE-1Mbps Low CH	Temp/Hum	26.1(°C)/ 52%RH
Test Item	Harmonic	Test Date	September 10, 2019
Polarize	Horizontal	Test Engineer	Jerry Lu
Detector	Peak and Average		

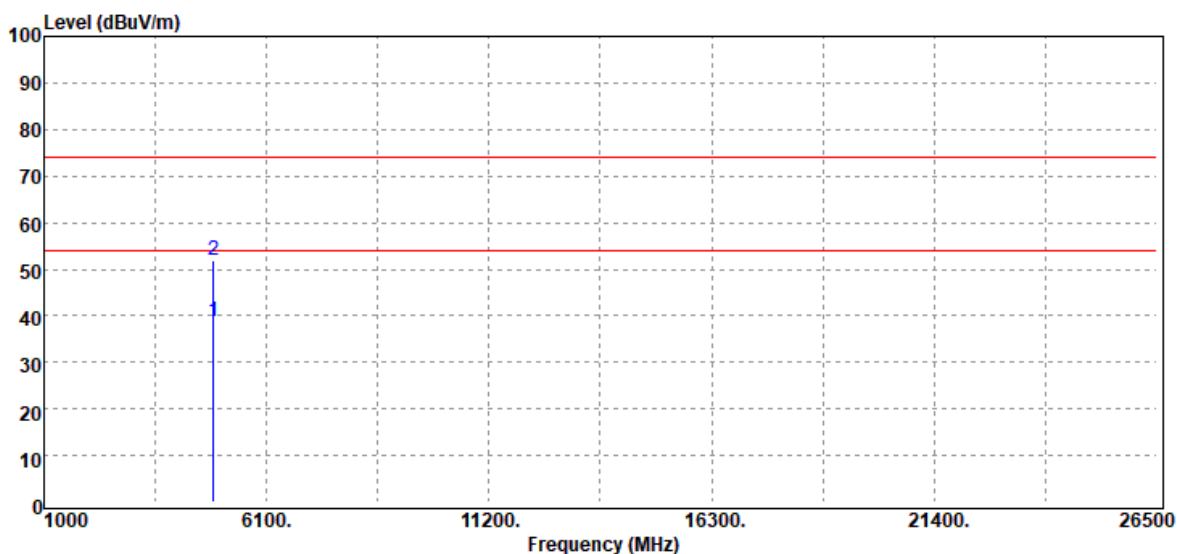


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4804.00	34.94	3.05	37.99	54.00	-16.01	Average
4804.00	49.06	3.05	52.11	74.00	-21.89	Peak
N/A						

Remark:

- Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

Test Mode:	BLE-1Mbps Mid CH	Temp/Hum	26.1(°C)/ 52%RH
Test Item	Harmonic	Test Date	September 10, 2019
Polarize	Vertical	Test Engineer	Jerry Lu
Detector	Peak and Average		

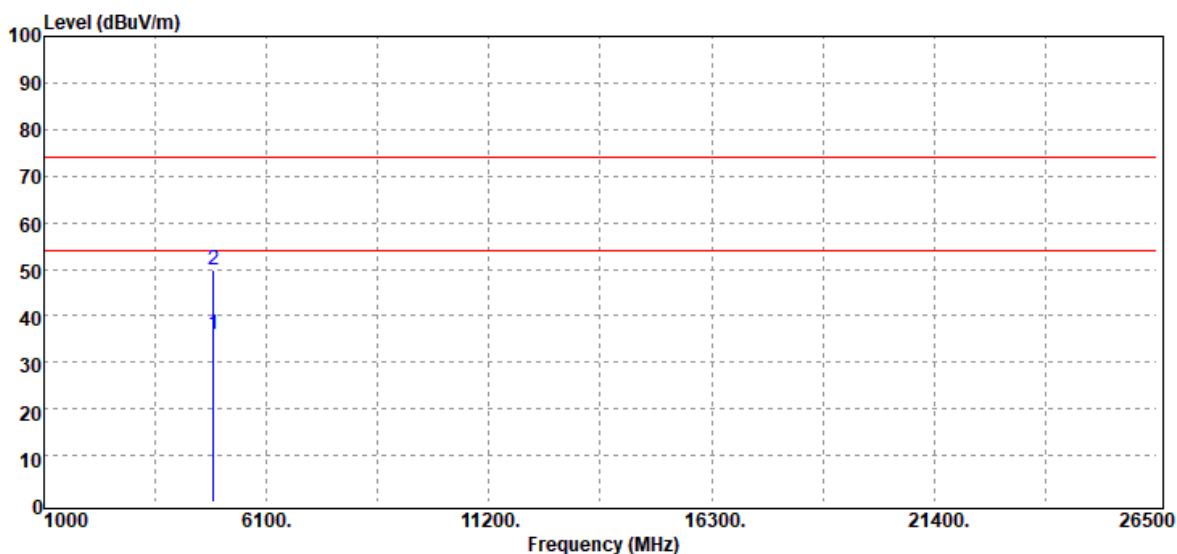


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4880.00	35.23	3.37	38.60	54.00	-15.40	Average
4880.00	48.55	3.37	51.92	74.00	-22.08	Peak
N/A						

Remark:

- Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

Test Mode:	BLE-1Mbps Mid CH	Temp/Hum	26.1(°C)/ 52%RH
Test Item	Harmonic	Test Date	September 10, 2019
Polarize	Horizontal	Test Engineer	Jerry Lu
Detector	Peak and Average		

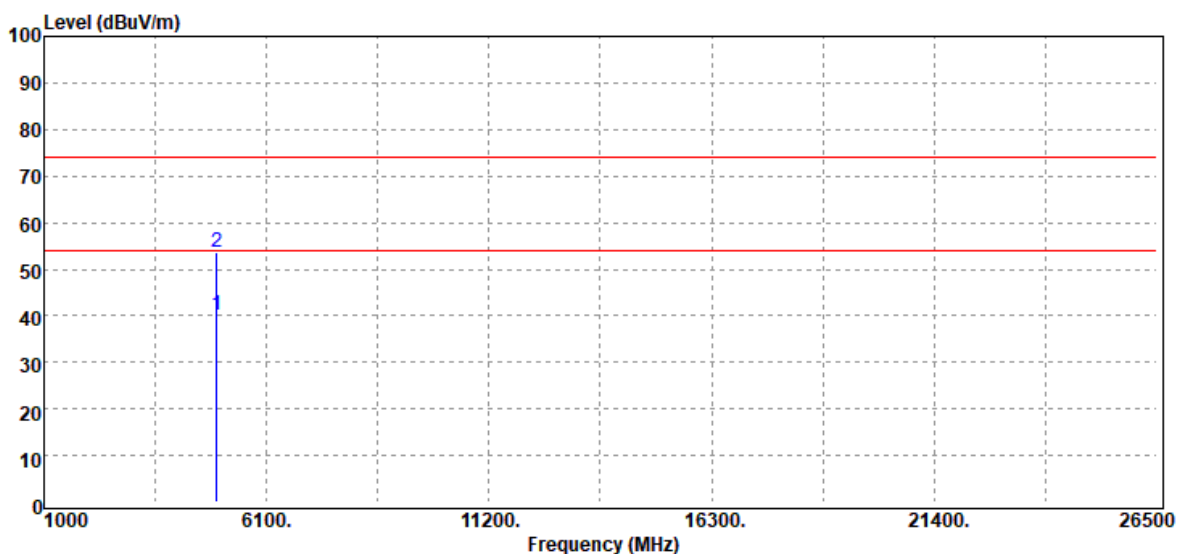


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4880.00	32.58	3.37	35.95	54.00	-18.05	Average
4880.00	46.62	3.37	49.99	74.00	-24.01	Peak
N/A						

Remark:

- Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

Test Mode:	BLE-1Mbps High CH	Temp/Hum	26.1(°C)/ 52%RH
Test Item	Harmonic	Test Date	September 10, 2019
Polarize	Vertical	Test Engineer	Jerry Lu
Detector	Peak and Average		

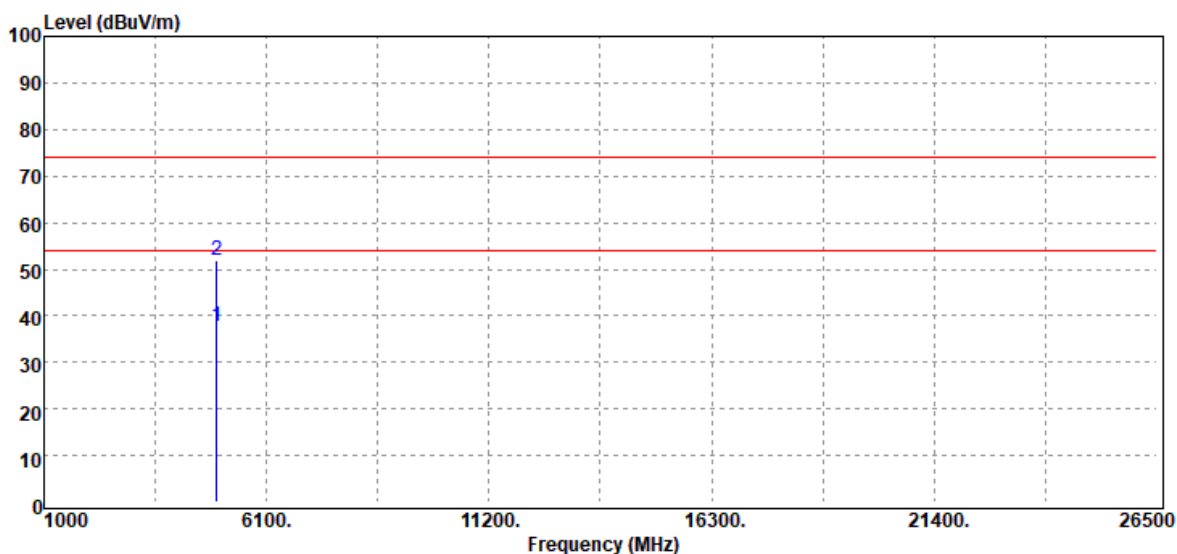


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4960.00	36.23	4.06	40.29	54.00	-13.71	Average
4960.00	49.61	4.06	53.67	74.00	-20.33	Peak
N/A						

Remark:

- Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

Test Mode:	BLE-1Mbps High CH	Temp/Hum	26.1(°C)/ 52%RH
Test Item	Harmonic	Test Date	September 10, 2019
Polarize	Horizontal	Test Engineer	Jerry Lu
Detector	Peak and Average		



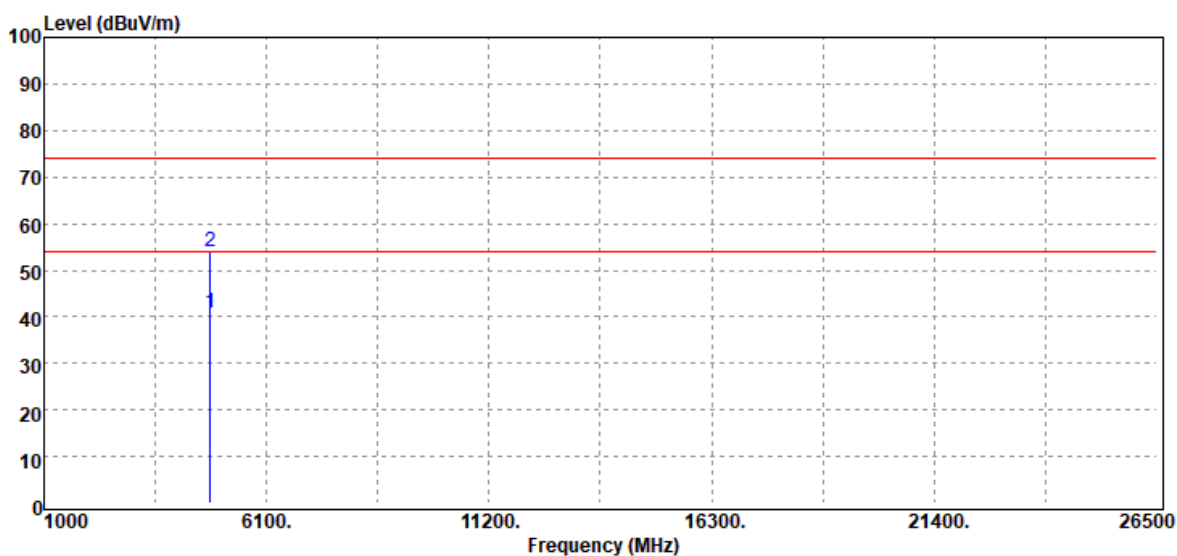
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4960.00	33.79	4.06	37.85	54.00	-16.15	Average
4960.00	47.71	4.06	51.77	74.00	-22.23	Peak
N/A						

Remark:

- Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

For Bluetooth 5.0

Test Mode:	BLE-2Mbps Low CH	Temp/Hum	26.1(°C)/ 52%RH
Test Item	Harmonic	Test Date	September 10, 2019
Polarize	Vertical	Test Engineer	Jerry Lu
Detector	Peak and Average		

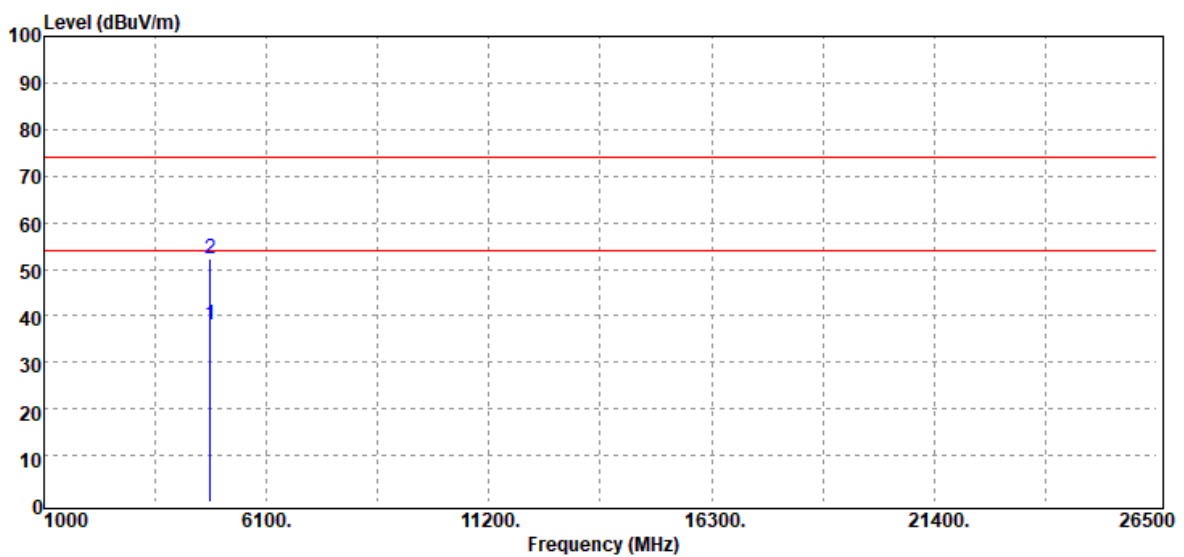


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4804.00	37.61	3.05	40.66	54.00	-13.34	Average
4804.00	51.08	3.05	54.13	74.00	-19.87	Peak
N/A						

Remark:

- Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

Test Mode:	BLE-2Mbps Low CH	Temp/Hum	26.1(°C)/ 52%RH
Test Item	Harmonic	Test Date	September 10, 2019
Polarize	Horizontal	Test Engineer	Jerry Lu
Detector	Peak and Average		

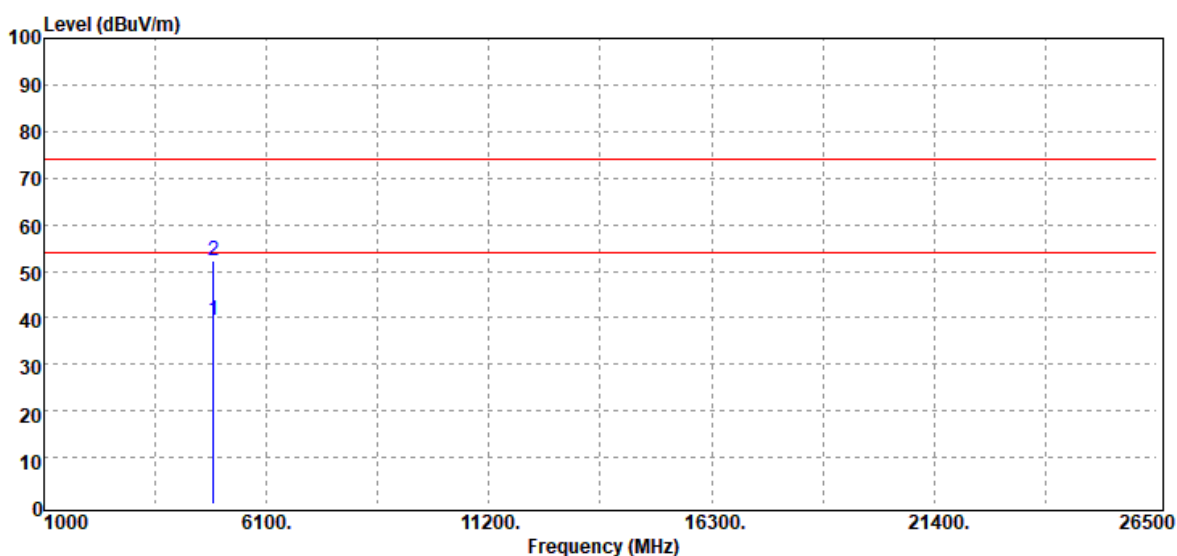


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4804.00	35.10	3.05	38.15	54.00	-15.85	Average
4804.00	49.19	3.05	52.24	74.00	-21.76	Peak
N/A						

Remark:

- Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

Test Mode:	BLE-2Mbps Mid CH	Temp/Hum	26.1(°C)/ 52%RH
Test Item	Harmonic	Test Date	September 10, 2019
Polarize	Vertical	Test Engineer	Jerry Lu
Detector	Peak and Average		

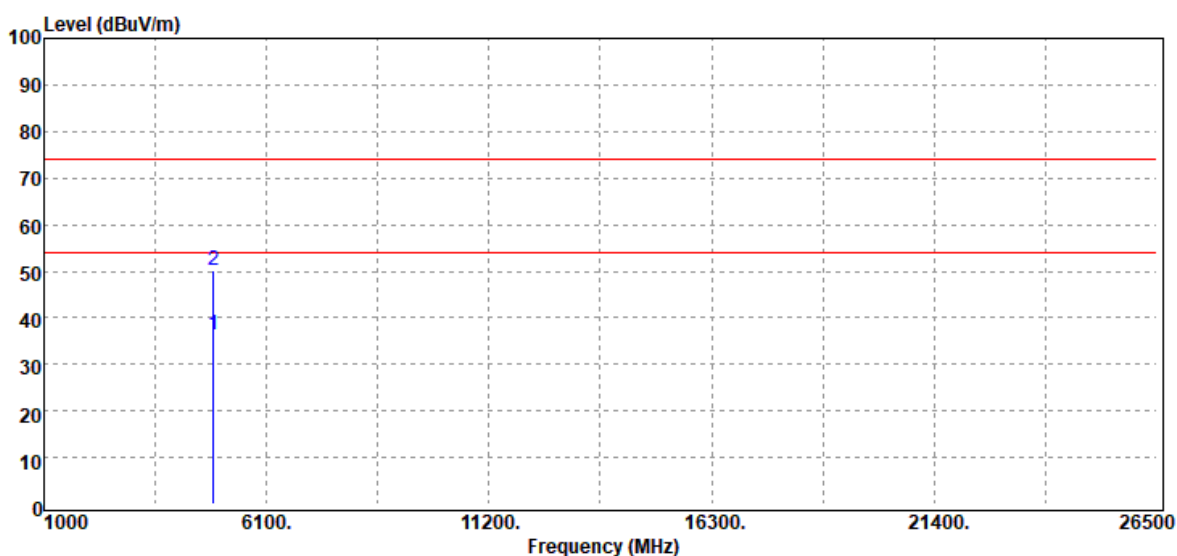


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4880.00	35.91	3.37	39.28	54.00	-14.72	Average
4880.00	49.01	3.37	52.38	74.00	-21.62	Peak
N/A						

Remark:

- Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

Test Mode:	BLE-2Mbps Mid CH	Temp/Hum	26.1(°C)/ 52%RH
Test Item	Harmonic	Test Date	September 10, 2019
Polarize	Horizontal	Test Engineer	Jerry Lu
Detector	Peak and Average		

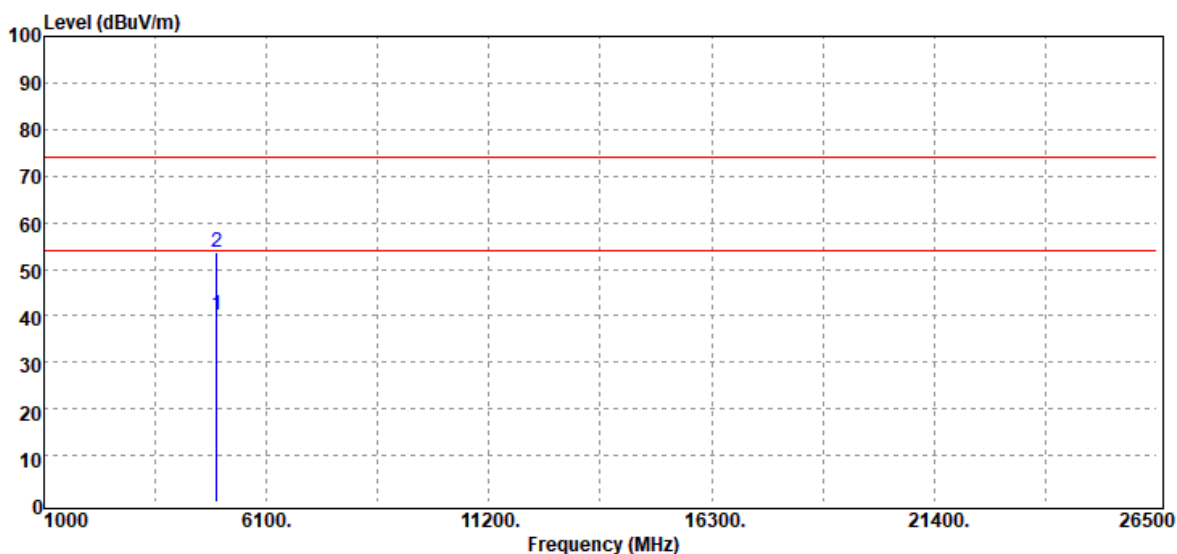


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4880.00	32.89	3.37	36.26	54.00	-17.74	Average
4880.00	46.88	3.37	50.25	74.00	-23.75	Peak
N/A						

Remark:

- Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

Test Mode:	BLE-2Mbps High CH	Temp/Hum	26.1(°C)/ 52%RH
Test Item	Harmonic	Test Date	September 10, 2019
Polarize	Vertical	Test Engineer	Jerry Lu
Detector	Peak and Average		

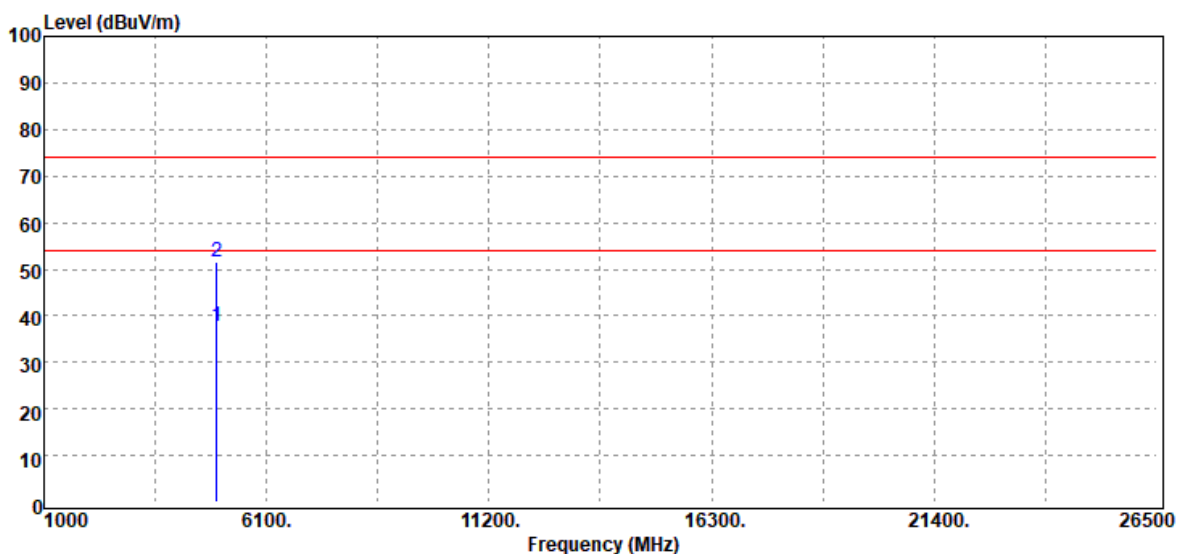


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4960.00	36.19	4.06	40.25	54.00	-13.75	Average
4960.00	49.62	4.06	53.68	74.00	-20.32	Peak
N/A						

Remark:

- Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

Test Mode:	BLE-2Mbps High CH	Temp/Hum	26.1(°C)/ 52%RH
Test Item	Harmonic	Test Date	September 10, 2019
Polarize	Horizontal	Test Engineer	Jerry Lu
Detector	Peak and Average		



Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4960.00	33.52	4.06	37.58	54.00	-16.42	Average
4960.00	47.51	4.06	51.57	74.00	-22.43	Peak
N/A						

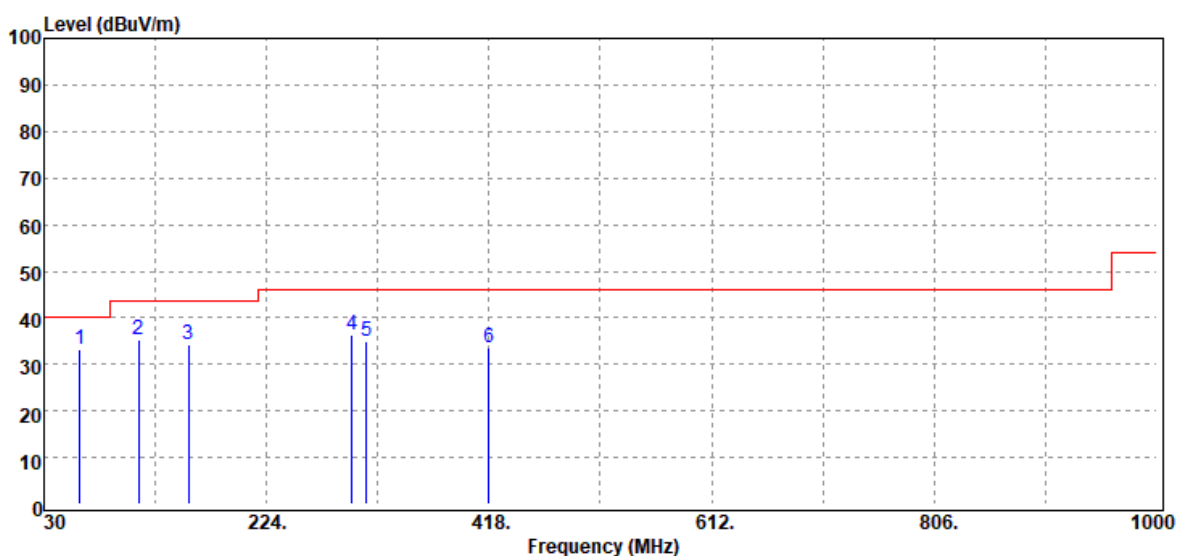
Remark:

- Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

Below 1G Test Data

For Bluetooth 4.2

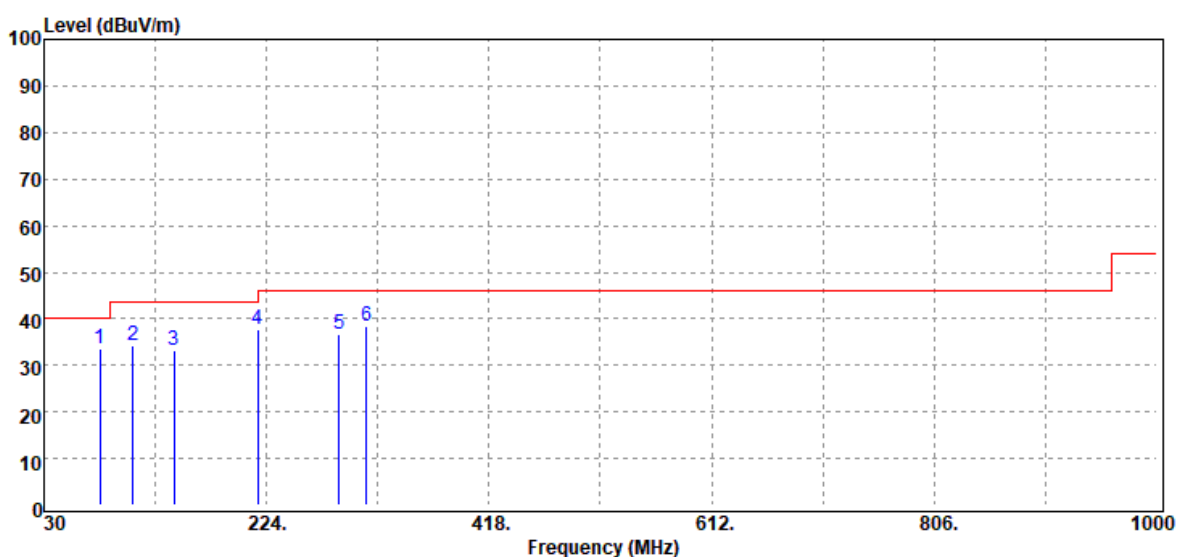
Test Mode:	BLE-1Mbps Mode	Temp/Hum	26.1(°C)/ 52%RH
Test Item	30MHz-1GHz	Test Date	September 10, 2019
Polarize	Vertical	Test Engineer	Jerry Lu
Detector	Peak		



Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
61.04	48.90	-15.64	33.26	40.00	-6.74	Peak
112.45	45.08	-9.65	35.43	43.50	-8.07	Peak
156.10	44.35	-10.01	34.34	43.50	-9.16	Peak
298.69	44.53	-8.27	36.26	46.00	-9.74	Peak
311.30	42.92	-7.86	35.06	46.00	-10.94	Peak
418.00	38.20	-4.68	33.52	46.00	-12.48	Peak

Note: No emission found between lowest internal used/generated frequency to 30MHz(9KHz~30MHz)

Test Mode:	BLE-1Mbps Mode	Temp/Hum	26.1(°C)/ 52%RH
Test Item	30MHz-1GHz	Test Date	September 10, 2019
Polarize	Horizontal	Test Engineer	Jerry Lu
Detector	Peak		

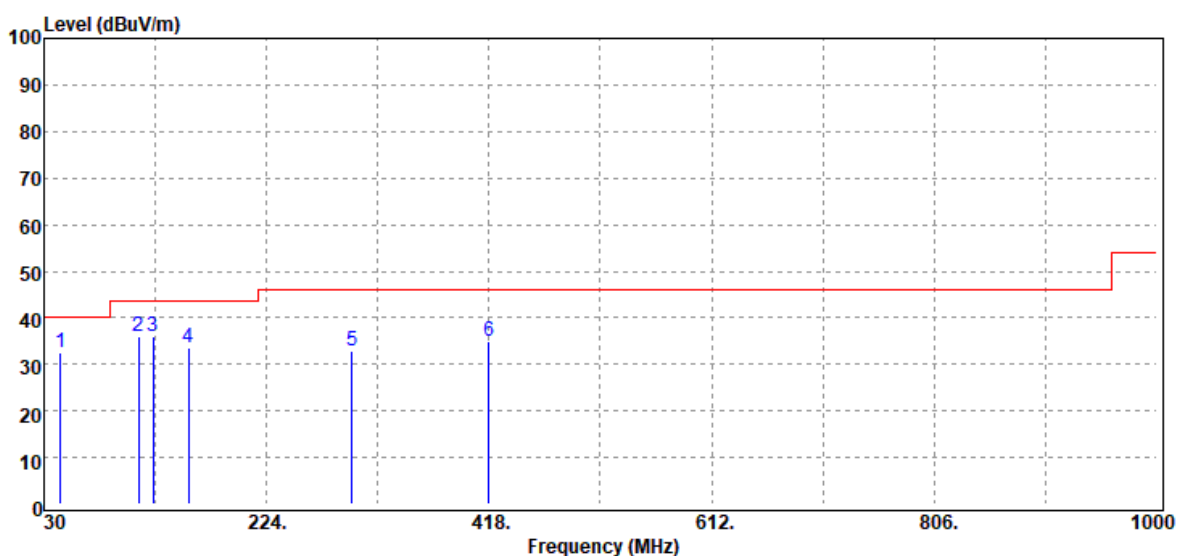


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
78.50	48.71	-15.08	33.63	40.00	-6.37	Peak
107.60	44.78	-10.67	34.11	43.50	-9.39	Peak
143.49	43.25	-9.86	33.39	43.50	-10.11	Peak
216.24	49.27	-11.45	37.82	46.00	-8.18	Peak
287.05	45.09	-8.41	36.68	46.00	-9.32	Peak
311.30	46.11	-7.86	38.25	46.00	-7.75	Peak

Note: No emission found between lowest internal used/generated frequency to 30MHz(9KHz~30MHz)

For Bluetooth 5.0

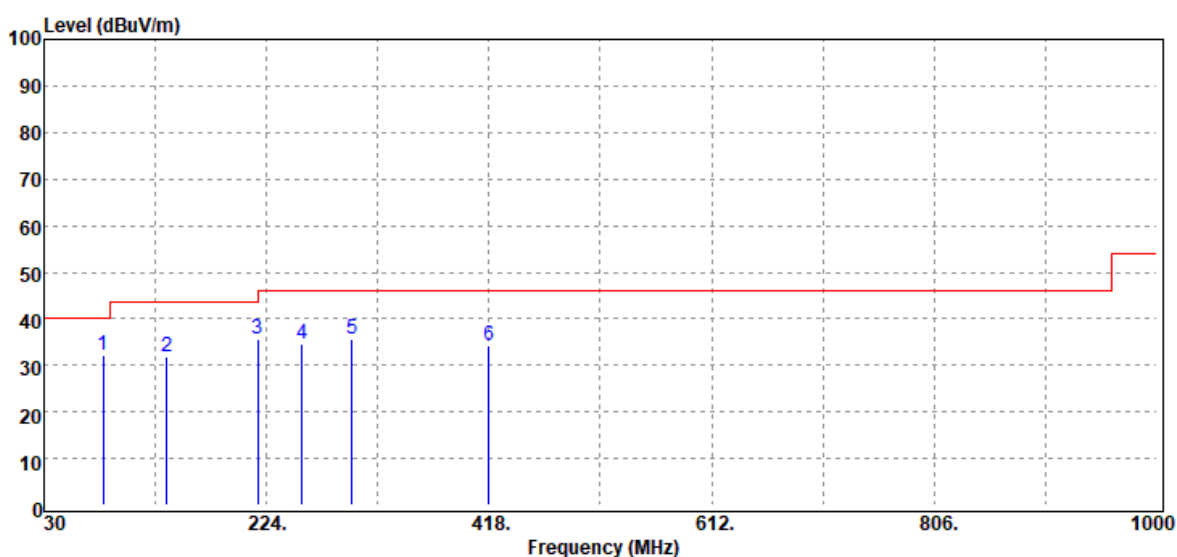
Test Mode:	BLE-2Mbps Mode	Temp/Hum	26.1(°C)/ 52%RH
Test Item	30MHz-1GHz	Test Date	September 10, 2019
Polarize	Vertical	Test Engineer	Jerry Lu
Detector	Peak		



Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
44.55	45.09	-12.72	32.37	40.00	-7.63	Peak
112.45	45.61	-9.65	35.96	43.50	-7.54	Peak
125.06	44.81	-8.80	36.01	43.50	-7.49	Peak
156.10	43.44	-10.01	33.43	43.50	-10.07	Peak
298.69	41.27	-8.27	33.00	46.00	-13.00	Peak
418.00	39.49	-4.68	34.81	46.00	-11.19	Peak

Note: No emission found between lowest internal used/generated frequency to 30MHz(9KHz~30MHz)

Test Mode:	BLE-2Mbps Mode	Temp/Hum	26.1(°C)/ 52%RH
Test Item	30MHz-1GHz	Test Date	September 10, 2019
Polarize	Horizontal	Test Engineer	Jerry Lu
Detector	Peak		



Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
81.41	47.68	-15.43	32.25	40.00	-7.75	Peak
136.70	41.41	-9.53	31.88	43.50	-11.62	Peak
216.24	47.02	-11.45	35.57	46.00	-10.43	Peak
255.04	44.99	-10.26	34.73	46.00	-11.27	Peak
298.69	43.74	-8.27	35.47	46.00	-10.53	Peak
418.00	38.84	-4.68	34.16	46.00	-11.84	Peak

Note: No emission found between lowest internal used/generated frequency to 30MHz(9KHz~30MHz)

--End of Test Report--