# TEST REPORT

Applicant:	inMusic Brands, Inc
EUT Description:	PORTABLE COLUMNAR ARRAY LOUDSPEAKER
Model:	TSA2, TS112C, TS******* (* can be "0-9", "A-Z", "a-z", blank, "-", "+" or any character, symbol, alphanumeric)
Brand:	ALTO
FCC ID:	Y4O-TSA2
Standards:	FCC 47 CFR Part 15 Subpart C
Date of Receipt:	2024/12/23
Date of Test:	2024/12/23 to 2025/01/22
Date of Issue:	2025/02/11

TOWE. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

the results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to assure that additional production units of the model are manufactured with identical electrical and mechanical components. All sample tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not taken into account unless noted otherwise. without written approval of TOWE, the test report shall not be reproduced except in full.

Huangkun Approved By:

ChenChengfu Reviewed By:



# **Revision History**

Rev.	Issue Date	Description	Revised by
01	2025/02/11	Original	Chen Chengfu



# **Product Differentiation Statement**

These models are identical, and all models have the same RF module and antenna, PCB layout, schematics and component. Only the models name are different.

Production name	Trademark	FCC ID	Model no.
PORTABLE COLUMNAR ARRAY LOUDSPEAKER	ALTO	Y4O-TSA2	TSA2, TS112C, TS****** (* can be "0-9", "A-Z", "a-z", blank, "-", "+" or any character, symbol, alphanumeric)

So, only the test data for Model No.(TS112C) was presented in the report.



# **Summary of Test Results**

Clause	FCC Part	Test Items	Result		
4.1	§15.203/15.247(b)	Antenna Requirement	PASS		
4.2	§15.207	AC Power Line Conducted Emission	PASS		
4.3	§15.247 (b)(3)	Output Power	PASS		
4.4	§15.247 (a)(2)	Occupied Bandwidth	Reporting purposes only		
4.5	§15.247 (e)	Power Spectral Density	PASS		
4.6	§15.247(d)	Band Edge for Conducted Emissions	PASS		
4.7	§15.247(d)	Spurious RF Conducted Emissions	PASS		
4.8	4.8§15.205 §15.209Radiated Spurious emissions and Band EdgePASS				
Test Method: ANSI C63.10:2020, KDB 558074 D01 15.247 Mesa Guidance v05r02. Remark: Pass is EUT meets standard requirements.					



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# 1.1 Lab Information

#### 1.1.1 Testing Location

These measurements tests were conducted at the Sushi TOWE Wireless Testing(Shenzhen) Co., Ltd. facility located at F401 and F101, Building E, Hongwei Industrial Zone, Liuxian 3rd Road, Bao'an District, Shenzhen, China. The measurement facility is compliant with the test site requirements specified in ANSI C63.4-2014 Tel.: +86-755-27212361

Contact Email: info@towewireless.com

#### 1.1.2 Test Facility / Accreditations

#### A2LA (Certificate Number: 7088.01)

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 General requirements for the competence of testing and calibration laboratories. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated April 2017).

#### FCC Designation No.: CN1353

Sushi TOWE Wireless Testing(Shenzhen) Co., Ltd. has been recognized as an accredited testing laboratory. Designation Number: CN1353.

#### ISED CAB identifier: CN0152

Sushi TOWE Wireless Testing(Shenzhen) Co., Ltd. has been recognized by ISED as an accredited testing laboratory. CAB identifier: CN0152 Company Number: 31000

## **1.2 Client Information**

#### 1.2.1 Applicant

Applicant:	inMusic Brands, Inc
Address:	200 SCENIC VIEW DRIVE, SUITE 201.CUMBERLAND. Rhode Island, United States,02864

#### 1.2.2 Manufacturer

Manufacturer:	inMusic Brands, Inc
Address:	200 SCENIC VIEW DRIVE, SUITE 201.CUMBERLAND. Rhode Island, United States,02864



# **1.3 Product Information**

EUT Description:	PORTABLE COLUMNAR ARRAY LOUDSPEAKER		
Model No.:	TSA2, TS112C, TS******* (* can be "0-9", "A-Z", "a-z", blank, "-", "+" or any character, symbol, alphanumeric)		
Brand:	ALTO		
Hardware Version:	V1.0		
Software Version:	N/A		
Bluetooth version:	Bluetooth V5.3		
Support Mode:	LE 1M PHY:1Mbps		
Modulation Type:	GFSK		
Frequency Range:	2400 ~ 2483.5MHz		
Channel Frequency: 2402 ~ 2480MHz			
Channel Number:	40		
Antenna Type:	External,  Integrated		
Antonno Coini	Ant (dBi)		
Antenna Gain:	2.81		
Remark: The above EUT's information was declared by applicant, please refer to the specifications or user's manual for more detailed description.			



# 2 Test Configuration

## 2.1 Test Channel

JUE

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

#### Remark:

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

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



# 2.2 Worst-case configuration and Mode

Modulation Type	LE 1M PHY
Transmitting mode	Keep the EUT was programmed to be in continuously transmitting mode
Normal Link	Keep the EUT operation to normal function.

## 2.3 Support Unit used in test

Description	Manufacturer	Model	Serial Number
Laptop	Lenovo	Thinkbook 14 G4+IAP	YX05AZ13

## 2.4 Test Environment

Temperature:	Normal: 15°C ~ 35°C
Humidity:	45-56 % RH Ambient
Voltage:	AC 110V
	AC 120V/60Hz for Conducted Emissions
Demarky The testing environm	port is within the score of the ELIT user manual and mosts the requirements of

Remark: The testing environment is within the scope of the EUT user manual and meets the requirements of the standard testing environment.

# 2.5 Test RF Cable

**For all conducted test items**: The offset level is set spectrum analyzer to compensate the RF cable loss and attenuator factor between RF conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level will be exactly the RF output level.

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Offset = RF cable loss + attenuator factor.

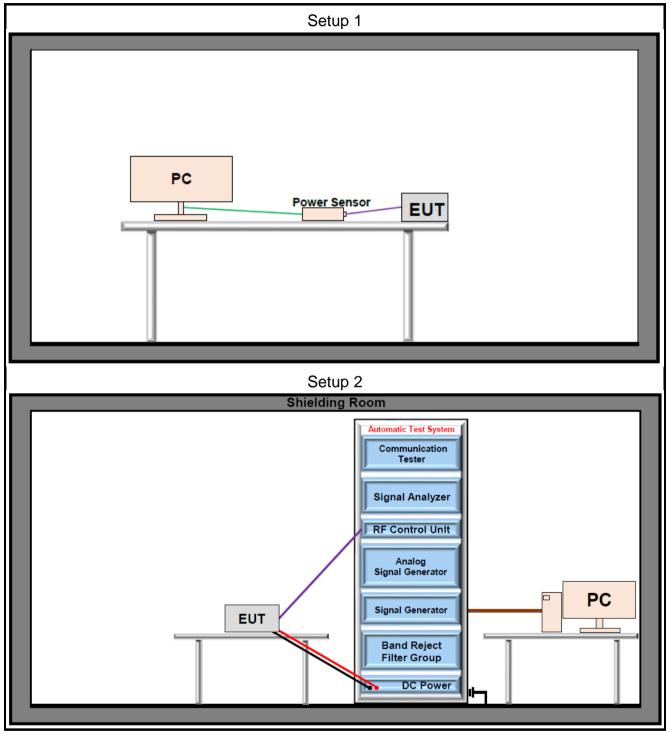
## 2.6 Modifications

No modifications were made during testing.

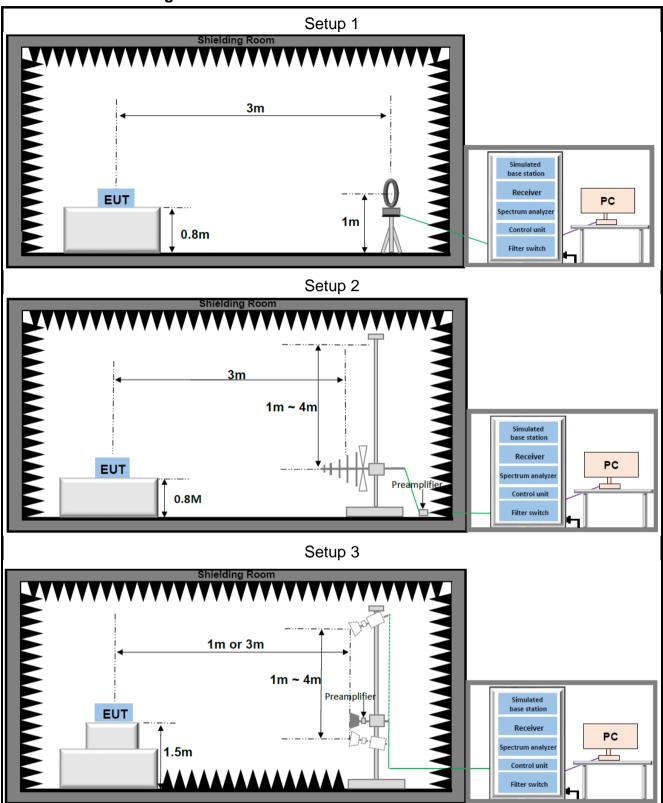


## 2.7 Test Setup Diagram

## 2.7.1 Conducted Configuration







# **3 Equipment and Measurement Uncertainty**

All test and measuring equipment utilized to perform the tests documented in this report are calibrated on a regular basis, whichever is less, and where applicable is traceable to recognized national standards.

# 3.1 Test Equipment List

СWЕ

		R	F		
Description	Manufacture	Model	S.N.	Last Due	Cal Due
Signal Analyzer	Keysight	N9020A	US46470429	2024/03/25	2025/03/24
Signal Generator	R&S	SMR20	101027	2024/03/25	2025/03/24
Vector Signal Generator	R&S	SMM100A	549353	2024/05/30	2025/05/29
Power Sensor	Anritsu	MA24408A	12520	2024/05/30	2025/05/29
RF Control Unit	Tonscend	JS0806-2	23C80620671	2024/05/30	2025/05/29
Measurement Software	Tonscend	TS1120-3	10659	N/A	N/A

	Ra	diated Emission			
Description	Manufacturer	Model	S.N.	Last Due	Cal Due
Biconic Logarithmic Periodic Antennas	Schwarzbeck	VULB9163	1643	2023/06/25	2025/06/24
Double-Ridged Horn Antennas	Schwarzbeck	BBHA 9120D	2809	2023/06/25	2025/06/24
Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	1290	2023/06/25	2025/06/24
Loop Antenna	Schwarzbeck	FMZB 1519C	1519C-028	2023/06/29	2025/06/28
Signal Analyzer	Keysight	N9020A	MY49100252	2024/03/25	2025/03/24
EXA Signal Analyzer, Multi- touch	Keysight	N9010B	MY63440541	2024/05/30	2025/05/29
Wideband Radio Communication Tester	R&S	CMW500	150645	2024/03/25	2025/03/24
Low Noise Amplifier	Tonscend	TAP9K3G40	AP23A8060273	2023/04/08	2025/04/07
Low Noise Amplifier	Tonscend	TAP01018050	AP22G806258	2023/04/08	2025/04/07
Low Noise Amplifier	Tonscend	TAP18040048	AP22G806247	2023/04/08	2025/04/07
Hygrometer	BINGYU	HTC-1	N/A	2023/06/01	2025/05/31
Band Reject Filter Group	Townshend	JS0806-F	23A806F0652	N/A	N/A
Test Software	Tonscend	TS+	Version: 5.0.0	N/A	N/A

Conducted Emission						
Description	Manufacturer	Model	S.N.	Last Due	Cal Due	
EMI Tester Receiver	Rohde & Schwarz	ESR3	103108	2024/05/31	2025/05/30	
	Dahda 8 Caburar		400000	2024/01/10	2025/01/09	
LISN	Rohde & Schwarz	ENV 216	102836	2025/01/04	2026/01/03	
Test software	Rohde & Schwarz	ELEKTRA V4.61	N/A	N/A	N/A	



# 3.2 Measurement Uncertainty

Parameter	U <sub>lab</sub>
Frequency Error	679.98Hz
Output Power	0.76dB
Conducted Spurious Emissions	2.22dB
Conducted Emissions(150kHz~30MHz)	2.43dB
Radiated Emissions(9kHz~30MHz)	2.40dB
Radiated Emissions(30MHz~1000MHz)	4.66dB
Radiated Emissions(1GHz~18GHz)	5.42dB
Radiated Emissions(18GHz~40GHz)	5.46dB

Uncertainty figures are valid to a confidence level of 95%



# 4 Test Results

# 4.1 Antenna Requirement

Standard Applicable:	47 CFR Part 15C Section 15.203 /247(b)
	hall be designed to ensure that no antenna other than that sed with the device. The use of a permanently attached antenna

furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

15.247(b) (4) requirement: The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

The antenna gain and type as provided by the manufacturer are as follows:

The antenna Type is Integrated. With maximum gain is 2.81dBi.

Antenna Anti-Replacement Construction: An embedded-in antenna design is used.



# 4.2 AC Power Line Conducted Emissions

<u>Limits</u>

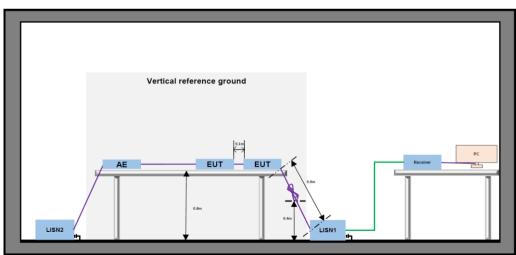
	Limit (dBµV)				
Frequency range (MHz)	Quasi-peak	Average			
0.15-0.5	66 to 56*	56 to 46*			
0.5-5	56	46			
5-30	60	50			
* Decreases with the logarithm of	the frequency.				

#### Test Procedure

ANSI C63.10:2020, Section 6.2.

#### Test Settings

- The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50Ω/50µH + 5Ω linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.
- 2. The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane.
- 3. The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.
- 4. The receiver is set to a resolution bandwidth of 9kHz. Peak detection s used netless otherwise noted as quasi-peak or average.
- 5. AC Power Line Conducted Emissions, the channel with the highest output power was tested.
- 6. Both sides of AC line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.



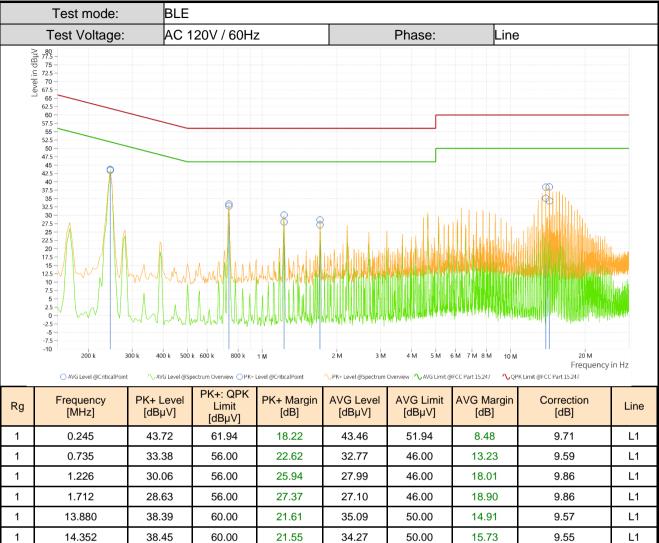
#### Test Setup

#### Measuring Instruments

The measuring equipment is listed in the section 3.1 of this test report.



#### Test Result:

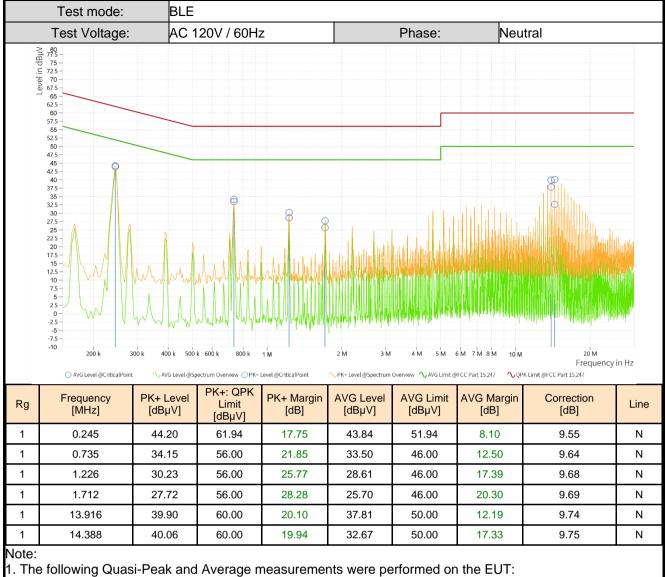


Note:

1. The following Quasi-Peak and Average measurements were performed on the EUT:

2. Margin[dB] = Limit[dB $\mu$ V] - Level[dB $\mu$ V]





2. Margin[dB] = Limit[dB $\mu$ V] - Level[dB $\mu$ V]



#### Limits

If With directional antenna gains less than 6 dBi, the limit is 30dBm.

#### Test Procedure

ANSI C63.10:2020 Section 11.9.1.2(PKPM1) or 11.9.2.3.2(AVGPM-G)

#### Test Settings

- 1. Set to the maximum power setting and enable the EUT transmit continuously.
- 2. The power output was measured on the EUT antenna port using RF Cable with attenuator connected to a power meter via wideband power sensor. Peak output power was read directly from power meter.
- 3. Measure and record the results in the test report.

#### Test Setup

Refer to section 2.7.1- Setup 1 for details.

#### Measuring Instruments

The measuring equipment is listed in the section 3.1 of this test report.

#### Test Result



#### <u>Limits</u>

DTSBW: The minimum 6 dB bandwidth shall be at least 500 kHz. 99%BW: None, for reporting purposes only.

#### Test Procedure

ANSI C63.10:2020 Section 11.8.2 and 6.9.3

#### Test Settings

- 1. Set to the maximum power setting and enable the EUT transmit continuously.
- 2. The transmitter output is connected to a spectrum analyzer:
- 3. RBW = 100kHz(DTS)
- 4. RBW = 1% 5%(99%BW)
- 5. VBW = 3 times the RBW
- 6. Sweep = Auto
- 7. Detector = Peak
- 8. Trace = Max hold
- 9. The trace was allowed to stabilize
- 10. Measure and record the results in the test report.

#### Test Notes

DTS: The signal analyzers' automatic bandwidth measurement capability of the spectrum analyzer was used to perform the 6dB bandwidth measurement. The "X" dB bandwidth parameter was set to X= 6. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.

#### Test Setup

Refer to section 2.7.1- Setup 2 for details.

#### Measuring Instruments

The measuring equipment is listed in the section 3.1 of this test report.

#### Test Result



#### <u>Limits</u>

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.

#### Test Procedure

ANSI C63.10:2020 Section 11.10.2(PKPSD)

#### Test Settings

- 1. Set to the maximum power setting and enable the EUT transmit continuously
- 2. The transmitter output is connected to a spectrum analyzer
- 3.  $3kHz \le RBW \le 100 kHz$ 
  - (If measured value exceeds requirement, then reduce RBW (but no less than 3 kHz) and repeat.)
- 4. VBW  $\geq$  3 times RBW
- 5. Span = 1.5 times the DTS bandwidth
- 6. Sweep = Auto
- 7. Detector = Peak
- 8. Trace = Max hold
- 9. The trace was allowed to stabilize
- 10. Measure and record the results in the test report.

#### Test Setup

Refer to section 2.7.1- Setup 2 for details.

#### Measuring Instruments

The measuring equipment is listed in the section 3.1 of this test report.

#### Test Result



# 4.6 Band Edge for Conducted Emissions

#### <u>Limits</u>

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 15.247(b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

#### Test Procedure

ANSI C63.10:2020 Section 11.11.3

#### Test Settings

- 1. Set to the maximum power setting and enable the EUT transmit continuously
- 2. The transmitter output is connected to a spectrum analyzer
- 3. RBW = 100kHz
- 4. VBW = 300kHz
- 5. Point  $\geq$  2 x span/RBW
- 6. Sweep = Auto
- 7. Detector = Peak
- 8. Trace = Max hold
- 9. The trace was allowed to stabilize
- 10. Measure and record the results in the test report

#### Test Setup

Refer to section 2.7.1- Setup 2 for details.

#### Measuring Instruments

The measuring equipment is listed in the section 3.1 of this test report.

#### Test Result



#### <u>Limits</u>

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 15.247(b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

#### Test Procedure

ANSI C63.10:2020 Section 11.11.3

#### Test Settings

- 1. Set to the maximum power setting and enable the EUT transmit continuously.
- 2. Activate frequency hopping function if necessary.
- 3. The transmitter output is connected to a spectrum analyzer
- 4. The spectrum from 30MHz 26.5GHz
- 5. RBW = 100kHz
- 6. VBW = 300kHz
- 7. Sweep = Auto
- 8. Detector = Peak
- 9. Trace = Max hold
- 10. The trace was allowed to stabilize
- 11. Measure and record the results in the test report

#### Test Setup

Refer to section 2.7.1- Setup 2 for details.

#### **Measuring Instruments**

The measuring equipment is listed in the section 3.1 of this test report.

#### Test Result



# 4.8 Radiated Spurious Emissions and Band Edge

#### **Limits**

Spurious emissions are permitted in an of the frequency bands:

MHz	MHz	MHz	MHz	GHz	GHz
0.090 - 0.110	12.29 - 12.293	149.9 - 150.05	1660 - 1710	4.5 - 5.15	14.47 - 14.5
0.495 - 0.505	12.51975 - 1252025	156.52475 - 156.52525	1718.8 - 1722.2	5.35 - 5.46	15.35 - 16.2
2.1735 - 2.1905	12.5767 - 12.57725	156.7 - 156.9	2200 - 2300	7.25 - 7.75	17.7 - 21.4
4.125 - 128	13.36 - 13.41	162.0125 - 167.17	2310 - 2390	8.025 - 8.5	22.01 - 23.12
4.17725 - 4.17775	16.42 - 16.423	167.72 - 173.2	2483.5 - 2500	9.0 - 9.2	23.6 - 24.0
4.20725 - 4.20775	16.69475 - 16.69525	240 - 285	2655 - 2900	9.3 - 9.5	31.2 - 31.8
6.215 - 6.218	1680425 - 1680475	322 - 335.4	3260 - 3267	10.6 - 12.7	36.43 - 36.5
6.26775 - 6.26825	25.5 - 25.67	399.9 - 410	3332 - 3339	13.25 - 13.4	
6.31175 - 6.31225	37.5 - 38.25	608 - 614	3345.8 - 3358		
8.291 - 8.294	73 - 74.6	960 - 1240	3600 - 4400		
8.362 - 8.366	74.8 - 75.2	1300 - 1427			
8.37625 - 8.38675	108 - 121.94	1435 - 1626.5			
8.41425 - 8.41475	123 - 138	1645.5 - 1646.5			

#### Radiated disturbance of an intentional radiator:

Frequency	Field strength (µV/m)	Limit (dBµV/m	Remark	Measurement distance (m)
0.009MHz-0.490MHz	2400/F(kHz)	-	-	300
0.490MHz-1.705MHz	24000/F(kHz)	-	-	30
1.705MHz-30MHz	30	-	-	30
30MHz-88MHz	100	40.0	Quasi-peak	3
88MHz-216MHz	150	43.5	Quasi-peak	3
216MHz-960MHz	200	46.0	Quasi-peak	3
960MHz-1GHz	500	54.0	Quasi-peak	3
Above 1GHz	500	74.0	Peak	3
Above IGHz	500	54.0	Average	3

#### Test Procedure

ANSI C63.10:2020 Section 6.4 & 6.5 & 6.6

#### **Test Settings**

- 1. For radiated emissions measurements performed at frequencies less than or equal to 1GHz, the EUT shall be placed on a RF-transparent table or support at a nominal height of 80cm above the reference ground plane.
- 2. For radiated emissions measurements performed at frequencies above 1GHz, the EUT shall be placed on a RF-transparent table or support at a nominal height of 80cm above the ground plane.
- 3. Radiated measurements shall be made with the measurement antenna positioned in both horizontal and vertical polarization. The measurement antenna shall be varied from 1m to 4m in height above the reference ground in a search for the relative positioning that produces the maximum radiated signal level (i.e, field strength or received power), when orienting the measurement antenna in vertical polarization, the minimum height of the lowest element of the antenna shall clear the site reference ground plane by at least 25cm.
- 4. For each suspected emission, the EUT was ranged its worst case and then tune the antenna tower(from 1~4m) and turntable(from 0~360°) find the maximum reading. Preamplifier and a high pass filter are used for the test in order get better signal level comply with the guidelines.
- 5. Set to the maximum power setting and enable the EUT transmit continuously.
- 6. The emission limits shown in the above table are based on measurements employing a CISPR quasipeak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.
- spectrum analyzer setting: Measurements Below 1000MHz: RBW = 120 kHz; VBW ≥ 300 kHz; Detector = Peak Measurements Above 1000MHz: RBW = 1 MHz; VBW ≥ 3 MHz; Detector = Peak



Average Measurements Above 1000MHz:

RBW = 1 MHz, VBW  $\geq$  1/T, with peak detector for average measurements.

8. The field strength is calculated by adding the Antenna Factor, Cable Factor. The basic equation with a sample calculation is as follows:

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

AF = Antenna Factor(dB/m)

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

Margin = Limit(dBµV/m) – Level(dBµV/m)

- 9. Repeat above procedures until all frequencies measured was complete.
- 10. Measure and record the results in the test report.

#### Test Notes

- 1. Emissions below 18GHz were measured at a 3-meter test distance while emissions above 18GHz were measured at a 1-meter test distance with the application of a distance correction factor.
- Radiated spurious emissions were investigated from 9kHz to 30MHz, 30MHz-1GHz and above 1GHz. the disturbance between 9kHz to 30MHz, 30MHz-1GHz and 18GHz to 40GHz was very low. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be recorded, so only the harmonics had been displayed.
- 3. The "-" shown in the following RSE tables are used to denote a noise floor measurement.

#### Test Setup

Refer to section 2.7.2 for details.

#### **Measuring Instruments**

The measuring equipment is listed in the section 3.1 of this test report.

#### Test Result



The detailed test data see: Appendix A - BT Setup Photos



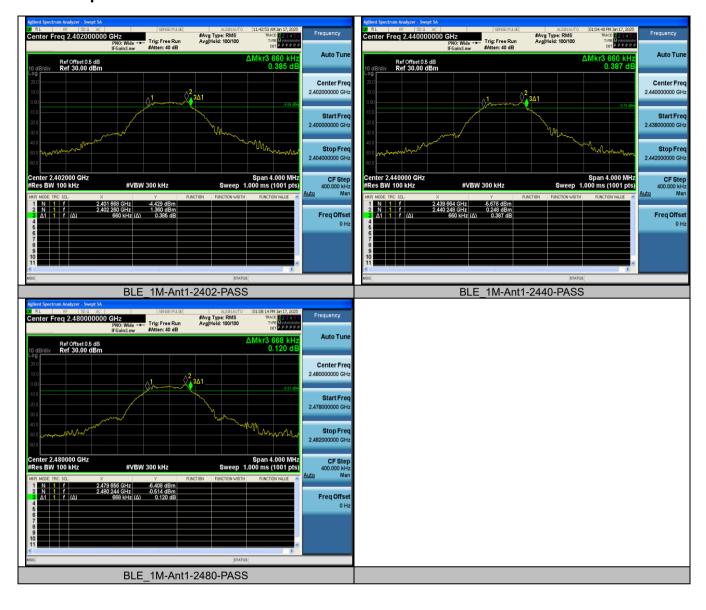
# Appendix

# DTS Bandwidth

Test Result

TestMode	Antenna	Frequency[MHz]	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	0.660	2401.668	2402.328	0.5	PASS
BLE_1M	Ant1	2440	0.660	2439.664	2440.324	0.5	PASS
BLE_1M	Ant1	2480	0.668	2479.656	2480.324	0.5	PASS







## Occupied Channel Bandwidth Test Result

TestMode	Antenna	Frequency[MHz]	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	1.0238	2401.4960	2402.5198		
BLE_1M	Ant1	2440	1.0193	2439.4922	2440.5115		
BLE_1M	Ant1	2480	1.0307	2479.4847	2480.5154		



RL RF 50Ω AC	Center	Freq: 2.402000000 GHz	ALIGNAUTO 11:43:01 AM Jan 17, 202 Radio Std: None	Frequency	RL RF 50Ω AC Constan Erect 2 440000000	CHa Ce	nter Freq: 2.440000000 GHz	Rad	:04:48 PM Jan 17, 2025 dio Std: None	Frequency
enter Freq 2.40200000	#IFGain:Low #Atten:	ee Run Avg Hold	1: 100/100 Radio Device: BTS		Center Freq 2.440000000	++- Tri	ig: Free Run Avg Ho tten: 40 dB	old: 100/100	dio Device: BTS	
Ref Offset 0.5 dE 0 dB/div Ref 30.00 dBr	3		Mkr1 2.402244 GH -0.16441 dBn	2	Ref Offset 0.5 dB 10 dB/div Ref 30.00 dBm			Mkr1 2.4	440252 GHz 084863 dBm	
0 dB/div Ref 30.00 dBr			-0.10441 dbi		10 dB/div Ref 30.00 dBm				04000 abiii	O antas E
0.0		1		Center Freq 2.402000000 GHz	10.0		1			Center Fr 2.440000000 G
0.00	- m	mil			0.00	~	mm			
0.0					-20.0					
0.0	m	V	man A		-30.0	m		m		
0.0 monoton Mar				R.	-50.0			M	mmm	
enter 2.402 GHz Res BW 43 kHz	#\	/BW 130 kHz	Span 4 MH Sweep 2.067 m	s 400.000 kHz	Center 2.44 GHz #Res BW 43 kHz		#VBW 130 kHz	Sw	Span 4 MHz /eep 2.067 ms	CF S 400.000
Occupied Bandwidt 1.	<sup>th</sup> .0238 MHz	Total Power	8.53 dBm	Auto Man Freq Offset	Occupied Bandwidth 1.(	h 0193 MHz	Total Power	7.51 dB	lm	Auto Freq Off
Transmit Freq Error	7.893 kHz	OBW Power	99.00 %	0 Hz	Transmit Freq Error	1.883 kHz	OBW Power	99.00	%	(
x dB Bandwidth	1.255 MHz	x dB	-26.00 dB		x dB Bandwidth	1.235 MHz	x dB	-26.00 c	dB	
20			074710		400			STATIS		
G	BLE	1M-Ant1-24	status		MSG	BL	= 1M-Ant1-2	status		
sa silent Spectrum Analyzer - Occupied I		1M-Ant1-24			MSG	BLE	E_1M-Ant1-2			
RL RF 50Ω AC	GHz Center	vse:PULSE Freq: 2.480000000 GHz	ALIGNAUTO 01:08:23 FM Jan 17, 202 Radio Std: None	5 Frequency	MSG	BLI	E_1M-Ant1-2			
	GHz Center	vse:PULSE Freq: 2,480000000 GHz ree Run Avg Holo	ALIGNAUTO 01:08:23 PM Jan 17, 202 & 100/100 Radio Std: None Radio Device: BTS	Frequency	MSG	BLI	E_1M-Ant1-2			
RL RF 50Ω AC enter Freq 2.480000000	GHz Center #IFGain:Low #Atten:	vse:PULSE Freq: 2,480000000 GHz ree Run Avg Holo	ALIGNAU.TO 01:08:23 PM Jan 17, 202 Radio Std: None ±: 100/100	Frequency	MIG	BLI	E_1M-Ant1-2			
RL RF 50.2 AC	GHz Center #IFGain:Low #Atten:	vse:PULSE Freq: 2,480000000 GHz ree Run Avg Holo	LO2 ALIGNAUTO 01:98:23 FM Jan 17, 202 Radio Std: None Radio Device: BTS Mkr1 2:480236 GH	Frequency	MIG	BL	E_1M-Ant1-2			
RL RF 50Ω AC enter Freq 2.480000000	GHz Center #IFGain:Low #Atten:	vse:PULSE Freq: 2,480000000 GHz ree Run Avg Holo	LO2 ALISNAUTO 01.982.3544 Jan 17, 202 Radio Std: None Radio Device: BTS Mkr1 2.480236 GH	Frequency	MIG	BLI	E_1M-Ant1-2			
RL RF 50Ω AC enter Freq 2.480000000	BW BR Center J GHz Center ///FGain:Low Atten: 3 11	vse:PULSE Freq: 2,480000000 GHz ree Run Avg Holo	LO2 ALISNAUTO 01.982.3544 Jan 17, 202 Radio Std: None Radio Device: BTS Mkr1 2.480236 GH	Center Freq	MIG	BLI	E_1M-Ant1-2			
RL RF 50Ω AC enter Freq 2.480000000	BW BR Center J GHz Center ///FGain:Low Atten: 3 11	VEEPULSE Freq: 2.480000000 GHz ee Run Avg Hold 40 dB	LO2 ALISNAUTO 01.982.3544 Jan 17, 202 Radio Std: None Radio Device: BTS Mkr1 2.480236 GH	Center Freq	MIG	BLI	E_1M-Ant1-2			
RL RF 50Ω AC enter Freq 2.480000000	BW BR Center J GHz Center ///FGain:Low Atten: 3 11	Pres 2.48000000 GHz ee Run Avg Hold	LO2 ALISNAUTO 01.982.3544 Jan 17, 202 Radio Std: None Radio Device: BTS Mkr1 2.480236 GH	Center Freq	MIG	BLI	E <u>1M-Ant1-2</u>			
RL RF 50Ω AC enter Freq 2.480000000	BW BR Center J GHz Center ///FGain:Low Atten: 3 11	Pres 2.48000000 GHz ee Run Avg Hold	402 41944/170 0016823FM3h17,202 Radio Std: None Radio Std: None Radio Device: BTS Mkrt 2:480236 GH -1.1162 dBn	Center Freq	MIG	BLI	E <u>1M-Ant1-2</u>			
RL     PE     1500 arC       enter Freq 2.480000000     Ref Offset 0.5 dE     Ref Offset 0.5 dE       dB/dly     Ref 30.00 dBr     Ref 30.00 dBr       00     Ref 30.00 dBr     Ref 30.00 dBr	BW BR Center J GHz Center ///FGain:Low Atten: 3 11	Pres 2.48000000 GHz ee Run Avg Hold	102 10108230M3/00 10108230M3/n12,202 Radio Std: None Radio Std: None Radio Device: 115 Mkr1 2.480236 GH -1.1162 dBr	Center Freq 2.480000000 GHz	M3G	BLI	E <u>1M-Ant1-2</u>			
RL RF 50Ω AC enter Freq 2.480000000	W Centre O GHz Centre //IFGaln:Lew Akten: 3 m	Pres 2.48000000 GHz ee Run Avg Hold	410944/170 00108239M3n17,202 Radio Std: None Radio Std: None Radio Device: BTS Mkr1 2.4800236 GH -1.1162 dBn	Center Freq 2.48000000 GHz	MIG	BL	E <u>1M-Ant1-2</u>			
Rt     PE     SOO AC       enter Freq 2.480000000     Ref Offset 0.5 dE     Ref Offset 0.5 dE       0 dB/dly     Ref Offset 0.5 dE     Ref Offset 0.5 dE       0 00     0     0     0       0 00     0     0     0       0 00     0     0     0       0 00     0     0     0       0 00     0     0     0       0 00     0     0     0       0 00     0     0     0       0 00     0     0     0       0 00     0     0     0       0 00     0     0     0       0 00     0     0     0       0 00     0     0     0       0 00     0     0     0       0 00     0     0     0       0 00     0     0     0       0 00     0     0     0       0 00     0     0     0       0 00     0	w Starting Francisco Starting Fr	Pres 2.8000000 GHz Freg 2.8000000 GHz 40 dB	402 4194/070 0018823943/m17,202 Radio Std: None Radio Std: None Radio Device: BTS Mkr1 2.480236 GH -1.1162 dBn	Center Freq 2.480000000 GHz	MIG	BL	E <u>1M-Ant1-2</u>			
Rt     PE     SOO AC       enter Freq 2.480000000     Ref Offset 0.5 dE     Ref Offset 0.5 dE       0 dB/dly     Ref Offset 0.5 dE     Ref Offset 0.5 dE       0 00     0     0     0       0 00     0     0     0       0 00     0     0     0       0 00     0     0     0       0 00     0     0     0       0 00     0     0     0       0 00     0     0     0       0 00     0     0     0       0 00     0     0     0       0 00     0     0     0       0 00     0     0     0       0 00     0     0     0       0 00     0     0     0       0 00     0     0     0       0 00     0     0     0       0 00     0     0     0       0 00     0     0     0       0 00     0	aw Series of the	PFreg 2.480000000 GHz es Run Avg Hold 40 dB	402 ALISHUTTO 0010823PRJ3h17, 202 Radio Std: None Radio Std: None Radio Device: BTS Mkr1 2.480236 GH -1.1162 dBn -1.1162 dBn Span 4 MH Sweep 2.067 m	CF Step 40.000 kHz	MIG	BLI	E <u>1M-Ant1-2</u>			
Rt     PE     SOO AC       enter Freq 2.480000000     Ref Offset 0.5 dE     Ref Offset 0.5 dE       0 dB/dly     Ref Offset 0.5 dE     Ref Offset 0.5 dE       0 00     0     0     0       0 00     0     0     0       0 00     0     0     0       0 00     0     0     0       0 00     0     0     0       0 00     0     0     0       0 00     0     0     0       0 00     0     0     0       0 00     0     0     0       0 00     0     0     0       0 00     0     0     0       0 00     0     0     0       0 00     0     0     0       0 00     0     0     0       0 00     0     0     0       0 00     0     0     0       0 00     0     0     0       0 00     0	W GHz JFGalmitow AffGalmitow Attan: Attan	PFreg 2.480000000 GHz es Run Avg Hold 40 dB	102 ALISHAUTO 010823PHJan17,202 Radio Std: None Radio Std: None Radio Device: BTS Mkr1 2.480236 GH -1.1162 dBn -1.1162 dBn Span 4 MH Sweep 2.067 m 6.35 dBm 99.00 %	Center Freq 2.480000000 GHz 400.000 kHz 400.000 kHz Auto Man	MIG	BLI	E <u>1M-Ant1-2</u>			
Ref Offset 0.5 dE Ref Offset 0.5 dE Ref 30.00 dBr Ref 30.00 dBr	W GHz //FGain:low am m //fGain:low //Attan: //At	Prez 240000000 GHz es Run Avgitol 40 dB ////////////////////////////////////	402 ALISHAUTO 010823PRJ3h17, 202 Radio Std: None Radio Std: None Radio Device: BTS Mkr1 2.480236 GH -1.1162 dBn Span 4 MH Sweep 2.067 m 6.35 dBm	Center Frequency 2.480000000 GHz 400.000 kHz Auto Man	MIG	BLI	E <u>1M-Ant1-2</u>			
Ref Offset 0.5 dE Ref Offset 0.5 dE Ref 30.00 dBr Ref 40.00 dBr Ref 40.0	W GHz JFGalmitow AffGalmitow Attan: Attan	Preg 2 absolocoto GHz es Run AvgHold 40 dB //BW 130 kHz Total Power OBW Power	102 ALISHAUTO 010823PHJan17,202 Radio Std: None Radio Std: None Radio Device: BTS Mkr1 2.480236 GH -1.1162 dBn -1.1162 dBn Span 4 MH Sweep 2.067 m 6.35 dBm 99.00 %	Center Frequency 2.480000000 GHz 400.000 kHz Auto Man	MIG	BLI	E <u>1M-Ant1-2</u>			
Ref Offset 0.5 dE Ref Offset 0.5 dE Ref 30.00 dBr Ref 40.00 dBr Ref 40.0	W GHz JFGalmitow AffGalmitow Attan: Attan	Preg 2 absolocoto GHz es Run AvgHold 40 dB //BW 130 kHz Total Power OBW Power	102 ALISHAUTO 010823PHJan17,202 Radio Std: None Radio Std: None Radio Device: BTS Mkr1 2.480238 GH -1.1162 dBn -1.1162 dBn Span 4 MH Sweep 2.067 m 6.35 dBm 99.00 % -26.00 dB	Center Frequency 2.480000000 GHz 400.000 kHz Auto Man	MIG	BLI	E <u>1M-Ant1-2</u>			
Ref Offset 0.5 dE Ref Offset 0.5 dE Ref 30.00 dBr Ref 30.0	W GHz JFGain:Low Attan: At	Preg 2 absolocoto GHz es Run AvgHold 40 dB //BW 130 kHz Total Power OBW Power	4094w170 41094w170 1018923943w17,202 Radio Std: None Radio Std: None Radio Device: BTS Mkr1 2.480236 GH -1.1162 dBn -1.1162 dBn Span 4 MH Sweep 2.067 m 6.35 dBm 99.00 % -26.00 dB	Center Frequency 2.480000000 GHz 400.000 kHz Auto Man	MIG	BLI	E <u>1M-Ant1-2</u>			



## Maximum conducted output power Test Result Peak

TestMode	Antenna	Frequency[MHz]	Conducted Peak Power[dBm]	Conducted Limit[dBm]	Verdict
BLE_1M	Ant1	2402	2.631	≤30	PASS
BLE_1M	Ant1	2440	1.846	≤30	PASS
BLE_1M	Ant1	2480	0.815	≤30	PASS

## **Test Result Average**

TestMode	Antenna Frequency[MHz]		Conducted Average Power[dBm]	Conducted Limit[dBm]	Verdict
BLE_1M	Ant1	2402	1.912	≤30	PASS
BLE_1M	Ant1	2440	1.173	≤30	PASS
BLE_1M	Ant1	2480	0.124	≤30	PASS



# Maximum power spectral density Test Result

TestMode	Antenna	Frequency[MHz]	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
BLE_1M	Ant1	2402	-14.83	≤8.00	PASS
BLE_1M	Ant1	2440	-15.98	≤8.00	PASS
BLE_1M	Ant1	2480	-16.69	≤8.00	PASS



#### Frequency Frequency enter Freq 2.402000000 GHz enter Freq 2.440000000 GHz #Avg Type: RMS AvgHold: 100/100 #Avg Type: RMS Avg/Hold: 100/100 Trig: Free Run Trig: Free Run 12345 M Auto Tun Auto Tun 02 025 19 GI -14.833 dB 0 229 53 GI -15.983 dB Ref Offset 0.5 dB Ref 20.00 dBm Ref Offset 0.5 dB Ref 20.00 dBm Center Freq Center Freq 2.402000000 GH 2.44000000 GH Start Free Start Fred 2.401340000 GH 2.439340000 GI **♦**<sup>1</sup> hall Malle Werke www.w man manner WWW Stop Free Stop Free 4 VIIIIII 2.402660000 GH 2.440660000 GH CF Step 132.000 kHz Man CF Step 132.000 kHz Mar uto uto Freg Offse Freq Offse он 0 H Span 1.320 MHz Sweep 140.0 ms (30000 pts) Span 1.320 MHz Sweep 140.0 ms (30000 pts) Center 2.4020000 GHz Res BW 3.0 kHz Center 2.4400000 GHz #Res BW 3.0 kHz #VBW 10 kHz #VBW 10 kHz BLE\_1M-Ant1-2402-PASS BLE 1M-Ant1-2440-PASS RL RF 50Ω AC enter Freq 2.480000000 GHz PNO: Wide Frequency #Avg Type: RMS Avg[Hold: 100/100 Trig: Free Run PPPP Auto Tun Akr1 2 0 015 92 GI -16.687 dB Ref Offset 0.5 dB Ref 20.00 dBm Center Fred 21 Start Freq 2.479332000 GHz <mark>ا</mark> Stop Freq man minister 2.480668000 GH CF Step 133.600 kHz Mar Auto Freq Offse Span 1.336 MH Sweep 142.0 ms (30000 pt enter 2.4800000 GHz Res BW 3.0 kHz #VBW 10 kHz BLE 1M-Ant1-2480-PASS



# Band edge measurements Test Result

TestMode	Antenna	ChName	Frequency[MHz]	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	Low	2402	1.25	-50.04	≤-18.75	PASS
BLE_1M	Ant1	High	2480	-0.44	-53.45	≤-20.44	PASS



**Test Graphs** 

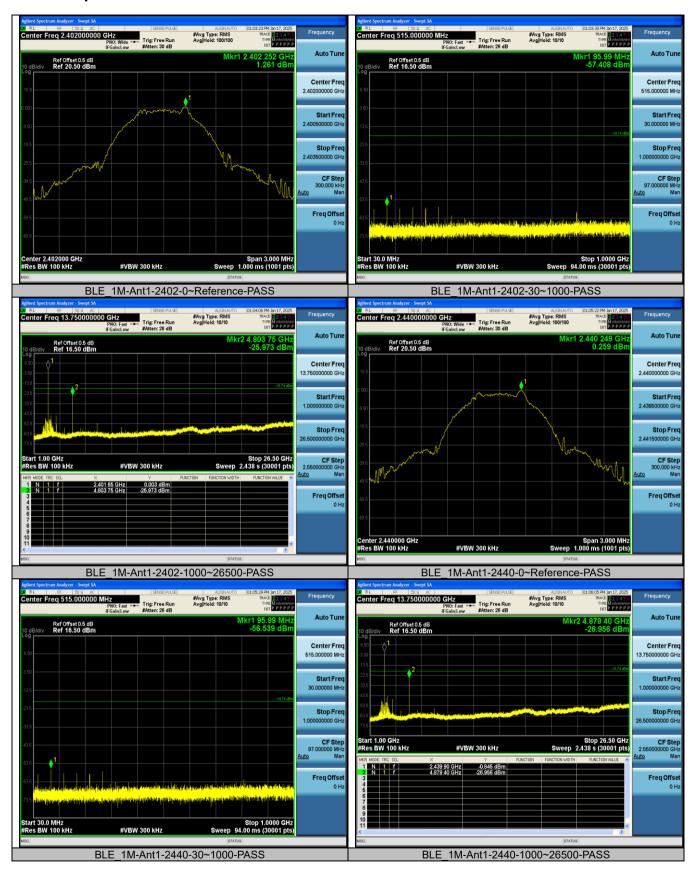
Agilent Spectrum Analyzer - Swept SA			Agilent Spectrum Analyzer - Swept Si	A Contraction of the second seco		
Z RL RF 50 Ω AC SENSEP Center Freq 2.352500000 GHz PN0: Fast →→ IFGain: Inv #Atten: 30 d	#Avg Type: RMS TRACE 1234 tun Avg Hold: 100/100 TYPE	Frequency	07 RL RF 50 Ω AC Center Freq 2.5100000		ALIGNAUTO 01:08:58 PM Jan 17, 2 #Avg Type: RMS TRACE 12 a Avg Hold: 100/100 Type M	Frequency
Ref Offset 0.5 dB 10 dB/div Ref 20.00 dBm	Mkr5 2.305 985 GF -50.037 dB	Z Auto Tune	Ref Offset 0.5 dB	II Gaint Ga	Mkr4 2.528 16 G -53.445 dE	
		Center Freq 2.352500000 GHz				Center Fre 2.510000000 GH
300 300 400 <b>15</b>		Start Freq 2.300000000 GHz	-20.0		-20.44	550 Start Fre 2.470000000 GF
60.0 60.0 70.0 70.0	Lowerson And And States	Stop Freq 2.405000000 GHz	-50.0 -60.0	allergensist gestigen and a relations	dun man and a second	Stop Fr 2.550000000 G
Start 2.30000 GHz #Res BW 100 kHz #VBW 300 kHz MKR MODE TRC SCL X Y	Stop 2.40500 GF Sweep 10.07 ms (1001 pt FUNCTION VALUE	Hz CF Step 10.500000 MHz Auto Man	Start 2.47000 GHz #Res BW 100 kHz	#VBW 300 kHz	Stop 2.55000 G Sweep 7.667 ms (1001 p	ts) 8.000000 M
1     N     1     f     2.402 270 GHz     1.254 dBn       2     N     1     f     2.400 000 GHz     50.169 dBn       3     N     1     f     2.390 000 GHz     57.000 dBn       4     N     1     f     2.300 000 GHz     57.000 dBn       5     N     1     f     2.300 000 GHz     57.000 dBn       5     N     1     f     2.305 996 GHz     50.037 dBn		Freq Offset 0 Hz	2 N 1 F 3 N 1 F	2 480 24 GHz -0.442 dBm 2 483 50 GHz -60.204 dBm 2 500 00 GHz -60.228 dBm 2 528 16 GHz -53.445 dBm		Freq Offs 01
6 6 7 8 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9			6 7 8 9 10			
11	STATUS	ř	A MSG	n	STATUS	
BLE_1M-A	nt1-2402-PASS			BLE_1M-Ant1	-2480-PASS	



# Conducted Spurious Emission Test Result

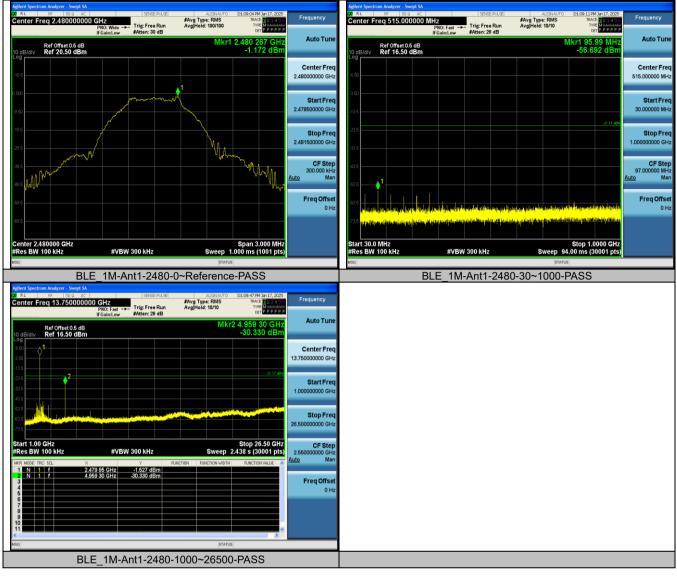
TestMode	Antenna	Frequency[MHz]	FreqRange [MHz]	RefLevel [dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	2402	0~Reference	1.26	1.26		PASS
BLE_1M	Ant1	2402	30~1000	1.26	-57.41	≤-18.74	PASS
BLE_1M	Ant1	2402	1000~26500	1.26	-25.97	≤-18.74	PASS
BLE_1M	Ant1	2440	0~Reference	0.26	0.26		PASS
BLE_1M	Ant1	2440	30~1000	0.26	-56.54	≤-19.74	PASS
BLE_1M	Ant1	2440	1000~26500	0.26	-26.96	≤-19.74	PASS
BLE_1M	Ant1	2480	0~Reference	-1.17	-1.17		PASS
BLE_1M	Ant1	2480	30~1000	-1.17	-56.69	≤-21.17	PASS
BLE 1M	Ant1	2480	1000~26500	-1.17	-30.33	≤-21.17	PASS







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TestMode	Antenna	Frequency[MHz]	ON Time [ms]	Period [ms]	Duty Cycle [%]	Duty Cycle Factor[dB]
BLE_1M	Ant1	2402	2.16	2.50	86.40	0.63
BLE_1M	Ant1	2440	2.16	2.50	86.40	0.63
BLE_1M	Ant1	2480	2.16	2.50	86.40	0.63



Agilent Spectrum Analyzer - Swept SA				Agilent Spectrum Analyzer - Swep			
Center Freq 2.402000000	GHz PN0: Fast ↔ Trig: Video		Frequency	Center Freq 2.440000			Frequency
Ref Offset 0.5 dB 10 dB/div Ref 10.50 dBm	IFGain:Low #Atten: 20 dB	ΔMkr3 2.500 ms -0.02 dB	Auto Tune	Ref Offset 0.5 o 10 dB/div Ref 10.50 dB	IFGain:Low #Atten: 20 dB	ост РРРРРР ΔMkr3 2.500 ms 0.01 dB	Auto Tune
Log 0.500 -9.50	<b>≬1</b>	<mark>}3∆1</mark> TRICLVE	Center Freq 2.402000000 GHz	0.500	≬1	3∆1 TRIGLVL	Center Freq 2.440000000 GHz
-19 5 -29 5 		2 <u>2</u> 1	Start Freq 2.402000000 GHz	-19.5 -29.5 -39.5 -49.5	trace of the second sec	2011 4.100	Start Freq 2.440000000 GHz
-59.5 -69.5 -79.5			Stop Freq 2.40200000 GHz	-69.5 -69.5 -79.5			Stop Freq 2.44000000 GHz
Center 2.402000000 GHz Res BW 8 MHz	#VBW 8.0 MHz	Span 0 Hz Sweep 5.000 ms (1001 pts)	CF Step 8.000000 MHz <u>Auto</u> Man	Center 2.440000000 GH Res BW 8 MHz	#VBW 8.0 MHz	Span 0 Hz Sweep 5.000 ms (1001 pts)	CF Step 8.000000 MHz <u>Auto</u> Man
1     N     1     t       2     Δ1     1     t     (Δ)       3     Δ1     1     t     (Δ)       5     6     6     6     6	1.990 ms 0.23 dBm 2.160 ms (Δ) -55.25 dB 2.500 ms (Δ) -0.02 dB		Freq Offset 0 Hz	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	1.990 ms		Freq Offset 0 Hz
7 8 9 10 11		•		7 9 10 11		×	
MSG		STATUS		MSG		STATUS	
Agilent Spectrum Analyzer - Swept SA	NTNV-BLE_1M-/	Anti-2402			NTNV-BLE_1M	1-Anti-2440	
00 RL RF 50 Q AC Center Freq 2.480000000	SENSE-PULSE CH2 Trig Delay-2.000 ms # PN0: Fast + Trig: Video IFGain:Low #Atten: 20 dB	ALIGNAUTO 01:08:07 PM Jan 17, 2025 IAvg Type: RMS TRACE 23456 TYPE WHILE A STRACE PPPP	Frequency				
Ref Offset 0.5 dB 10 dB/div Ref 10.50 dBm	Å1	ΔMkr3 2.500 ms 0.04 dB	Auto Tune				
0 500 -9 50 -19.5			Center Freq 2.48000000 GHz				
-29.5 -39.5 -49.5			Start Freq 2.48000000 GHz				
-59.5 -69.5 -79.5			<b>Stop Freq</b> 2.48000000 GHz				
Center 2.480000000 GHz Res BW 8 MHz	#VBW 8.0 MHz	Span 0 Hz Sweep 5.000 ms (1001 pts)	CF Step 8.000000 MHz <u>Auto</u> Man				
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	1.990 ms -1.39 dBm 2.160 ms (Δ) -11.94 dB 2.500 ms (Δ) 0.04 dB		Freq Offset 0 Hz				
< MSG	0	STATUS					
	NTNV-BLE 1M-						



## Test Result

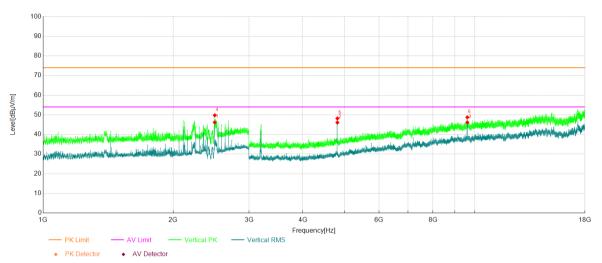


Data L	Data List							
NO.	Freq. [MHz]	Reading [dBuV]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity	Verdict
1	2498.20	49.08	2.40	51.48	54.00	2.52	Horizontal	PASS
2	2690.20	48.35	3.87	52.22	54.00	1.78	Horizontal	PASS
3	9608.50	45.82	2.85	48.67	54.00	5.33	Horizontal	PASS
4	2497.80	51.40	2.40	53.80	74.00	20.20	Horizontal	PASS
5	2689.80	50.53	3.87	54.40	74.00	19.60	Horizontal	PASS
6	9608.00	48.16	2.84	51.00	74.00	23.00	Horizontal	PASS



	Project Information						
Mode:	BLE	Band:	-				
Bandwidth	-	Channel	Low				
SN:	-	Engineer:	申状				
Remark:		-					

Test Graph

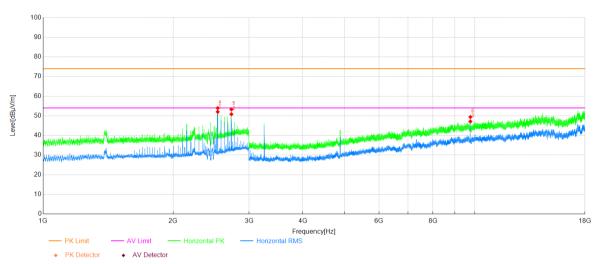


Data L	Data List							
NO.	Freq. [MHz]	Reading [dBuV]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity	Verdict
1	2498.20	43.75	2.40	46.15	54.00	7.85	Vertical	PASS
2	4805.00	53.65	-7.60	46.05	54.00	7.95	Vertical	PASS
3	9608.50	43.28	2.85	46.13	54.00	7.87	Vertical	PASS
4	2498.20	47.34	2.40	49.74	74.00	24.26	Vertical	PASS
5	4804.50	55.73	-7.59	48.14	74.00	25.86	Vertical	PASS
6	9608.00	45.88	2.84	48.72	74.00	25.28	Vertical	PASS



	Project Information							
Mode:	BLE	Band:	-					
Bandwidth	-	Channel	Mid					
SN:	-	Engineer:	申状					
Remark:		-						

Test Graph

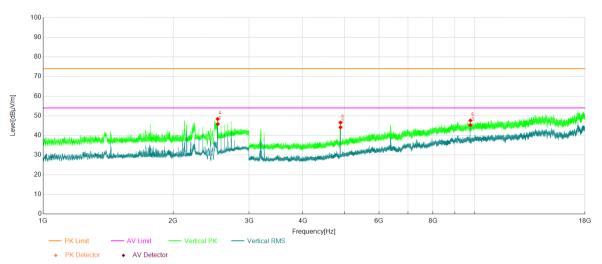


Data L	Data List							
NO.	Freq. [MHz]	Reading [dBuV]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity	Verdict
1	2538.20	49.61	2.40	52.01	54.00	1.99	Horizontal	PASS
2	2730.20	46.78	4.03	50.81	54.00	3.19	Horizontal	PASS
3	9768.50	44.40	2.70	47.10	54.00	6.90	Horizontal	PASS
4	2538.40	51.53	2.40	53.93	74.00	20.07	Horizontal	PASS
5	2730.00	49.23	4.03	53.26	74.00	20.74	Horizontal	PASS
6	9768.00	46.70	2.70	49.40	74.00	24.60	Horizontal	PASS



	Project Information						
Mode:	BLE	Band:	-				
Bandwidth	-	Channel	Mid				
SN:	-	Engineer:	申状				
Remark:		-					

Test Graph

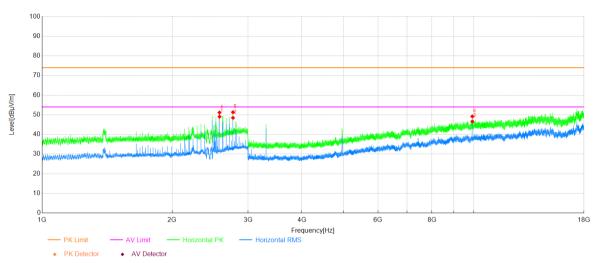


Data L	Data List							
NO.	Freq. [MHz]	Reading [dBuV]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity	Verdict
1	2538.20	43.41	2.40	45.81	54.00	8.19	Vertical	PASS
2	4885.00	52.17	-8.03	44.14	54.00	9.86	Vertical	PASS
3	9768.50	42.57	2.70	45.27	54.00	8.73	Vertical	PASS
4	2537.60	45.97	2.41	48.38	74.00	25.62	Vertical	PASS
5	4884.00	54.57	-8.03	46.54	74.00	27.46	Vertical	PASS
6	9768.00	44.90	2.70	47.60	74.00	26.40	Vertical	PASS



	Project Information							
Mode:	BLE	Band:	-					
Bandwidth	-	Channel	High					
SN:	-	Engineer:	申状					
Remark:		-						

Test Graph

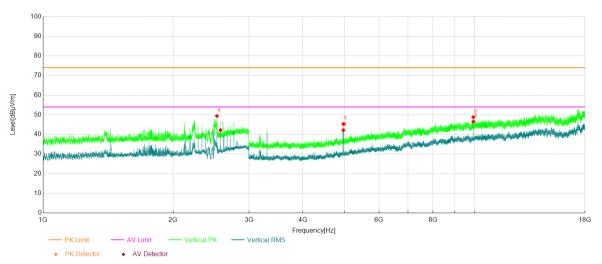


Data L	Data List							
NO.	Freq. [MHz]	Reading [dBuV]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity	Verdict
1	2576.60	46.49	2.54	49.03	54.00	4.97	Horizontal	PASS
2	2768.40	44.12	4.33	48.45	54.00	5.55	Horizontal	PASS
3	9920.50	43.41	3.17	46.58	54.00	7.42	Horizontal	PASS
4	2576.00	48.61	2.54	51.15	74.00	22.85	Horizontal	PASS
5	2768.00	46.99	4.32	51.31	74.00	22.69	Horizontal	PASS
6	9920.00	46.00	3.17	49.17	74.00	24.83	Horizontal	PASS



Project Information						
Mode:	BLE	Band:	-			
Bandwidth	-	Channel	High			
SN:	-	Engineer:	申状			
Remark:		-				

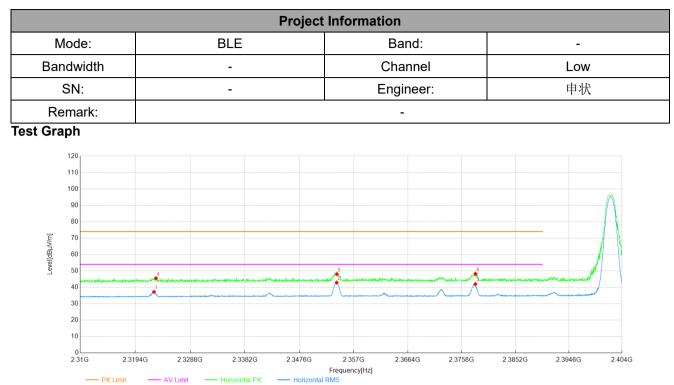
Test Graph



Data L	Data List									
NO.	Freq. [MHz]	Reading [dBuV]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity	Verdict		
1	2576.20	39.67	2.54	42.21	54.00	11.79	Vertical	PASS		
2	4960.50	49.71	-7.55	42.16	54.00	11.84	Vertical	PASS		
3	9920.50	43.39	3.17	46.56	54.00	7.44	Vertical	PASS		
4	2528.00	47.01	2.41	49.42	74.00	24.58	Vertical	PASS		
5	4960.00	52.88	-7.55	45.33	74.00	28.67	Vertical	PASS		
6	9920.00	45.64	3.17	48.81	74.00	25.19	Vertical	PASS		



## **Test Result**



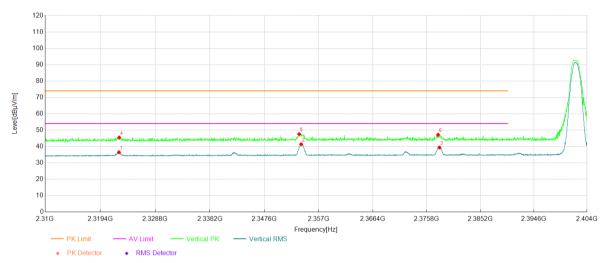
PK Detector
RMS Detector

Data L	Data List									
NO.	Freq. [MHz]	Reading [dBuV]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity	Verdict		
1	2322.60	36.01	1.21	37.22	54.00	16.78	Horizontal	PASS		
2	2354.04	41.43	1.45	42.88	54.00	11.12	Horizontal	PASS		
3	2378.20	40.56	1.44	42.00	54.00	12.00	Horizontal	PASS		
4	2322.94	44.34	1.22	45.56	74.00	28.44	Horizontal	PASS		
5	2354.07	46.63	1.45	48.08	74.00	25.92	Horizontal	PASS		
6	2378.20	46.84	1.44	48.28	74.00	25.72	Horizontal	PASS		



Project Information								
Mode:	BLE	Band:	-					
Bandwidth	-	Channel	Low					
SN:	-	Engineer:	申状					
Remark:		-						

Test Graph

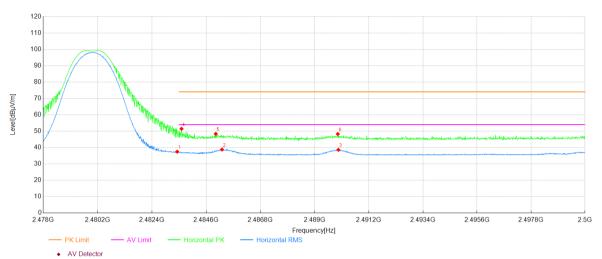


Data L	Data List									
NO.	Freq. [MHz]	Reading [dBuV]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity	Verdict		
1	2322.60	35.27	1.21	36.48	54.00	17.52	Vertical	PASS		
2	2353.94	39.98	1.45	41.43	54.00	12.57	Vertical	PASS		
3	2378.02	37.97	1.44	39.41	54.00	14.59	Vertical	PASS		
4	2322.63	44.30	1.21	45.51	74.00	28.49	Vertical	PASS		
5	2353.60	46.15	1.45	47.60	74.00	26.40	Vertical	PASS		
6	2377.80	45.77	1.44	47.21	74.00	26.79	Vertical	PASS		



	Project Information								
Mode:	BLE	Band:	-						
Bandwidth	-	Channel	High						
SN:	-	Engineer:	申状						
Remark:		-							

Test Graph

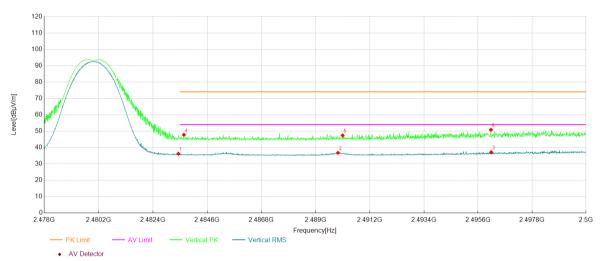


Data L	Data List									
NO.	Freq. [MHz]	Reading [dBuV]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity	Verdict		
1	2483.43	35.62	1.85	37.47	-	-	Horizontal	NA		
2	2485.24	36.89	1.88	38.77	54.00	15.23	Horizontal	PASS		
3	2489.96	36.68	1.93	38.61	54.00	15.39	Horizontal	PASS		
4	2483.60	49.61	1.86	51.47	74.00	22.53	Horizontal	PASS		
5	2484.99	46.49	1.87	48.36	74.00	25.64	Horizontal	PASS		
6	2489.94	46.34	1.93	48.27	74.00	25.73	Horizontal	PASS		



Project Information								
Mode:	BLE	Band:	-					
Bandwidth	-	Channel	High					
SN:	-	Engineer:	申状					
Remark:		-						

**Test Graph** 



Data L	Data List									
NO.	Freq. [MHz]	Reading [dBuV]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity	Verdict		
1	2483.44	34.34	1.85	36.19	-	-	Vertical	NA		
2	2489.91	34.85	1.93	36.78	54.00	17.22	Vertical	PASS		
3	2496.14	35.18	1.99	37.17	54.00	16.83	Vertical	PASS		
4	2483.66	45.92	1.86	47.78	74.00	26.22	Vertical	PASS		
5	2490.10	45.47	1.93	47.40	74.00	26.60	Vertical	PASS		
6	2496.13	48.85	1.99	50.84	74.00	23.16	Vertical	PASS		

~The End~