

RSS-247 TEST REPORT FOR CERTIFICATION

On Behalf of

Funai Electric R & D (Shenzhen) Co., Ltd.

WiFi module

U9W43

IC: 25625-U9W43

Prepared for : Funai Electric R & D (Shenzhen) Co., Ltd.
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Date of Report : Feb.28, 2022

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Appendix A. Photograph of Test

Appendix B. Photo of the EUT

TEST REPORT

Applicant : Funai Electric R & D (Shenzhen) Co., Ltd.
Manufacturer : Funai Electric R & D (Shenzhen) Co., Ltd.
Product : WiFi module
IC : 25625-U9W43
(A) Model No. : U9W43
(B) Test Voltage : DC 5V From PC Input AC 120V/60Hz

Test Procedure Used:
RSS-247, ISSUE 2, Feb 2017
RSS-Gen, ISSUE 5, April 2018
ANSI C63.10: 2020

The device described above is tested by Audix Technology (Shenzhen) Co., Ltd.. to confirm comply with all the RSS-247 requirement.

The test results are contained in this test report and Audix Technology (Shenzhen) Co., Ltd.. is assumed full responsibility for the accuracy and completeness of these tests. This report contains data that are not covered by the NVLAP accreditation. Also, this report shows that the Equipment Under Test (EUT) is to be technically compliant with the RSS-247 requirements.

This report applies to single evaluation of one sample of above mentioned product and shall not be reproduced in part without written approval of Audix Technology (Shenzhen) Co., Ltd..

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government.

Date of Test : Dec.08, 2021~Jan.08, 2022 Report of date: Feb.28, 2022

Prepared by : Honey Yi Reviewed by : Sunny Lu
Honey Yi / Assistant Sunny Lu / Deputy Manager



Approved & Authorized Signer : Signature: David Jin
David Jin / Deputy General Manager

1. SUMMARY OF STANDARDS AND RESULTS

1.1. Description of Standards and Results

The EUT has been tested according to the applicable standards as referenced below.

EMISSION		
Description of Test Item	Standard	Results
Power Line Conducted Emission Test	RSS-247, ISSUE 2 RSS-Gen, ISSUE 5 ANSI C63.10: 2020	PASS
Radiated Emission Test	RSS-247, ISSUE 2 RSS-Gen, ISSUE 5 ANSI C63.10: 2020	PASS
Conducted Spurious Emissions	RSS-247, ISSUE 2 RSS-Gen, ISSUE 5 ANSI C63.10: 2020	PASS
Carrier Frequency Separation Test	RSS-247, ISSUE 2 RSS-Gen, ISSUE 5 ANSI C63.10: 2020	PASS
20dB & 99% Bandwidth Test	RSS-247, ISSUE 2 RSS-Gen, ISSUE 5 ANSI C63.10: 2020	PASS
Number Of Hopping Frequency Test	RSS-247, ISSUE 2 RSS-Gen, ISSUE 5 ANSI C63.10: 2020	PASS
Dwell Time Test	RSS-247, ISSUE 2 RSS-Gen, ISSUE 5 ANSI C63.10: 2020	PASS
Maximum Peak Output Power Test	RSS-247, ISSUE 2 RSS-Gen, ISSUE 5 ANSI C63.10: 2020	PASS
Band Edge Compliance Test	RSS-247, ISSUE 2 RSS-Gen, ISSUE 5 ANSI C63.10: 2020	PASS
<p>Note: Measurement uncertainty affection to the result is considered, the EUT is technically compliant with standard requirements.</p>		

2. GENERAL INFORMATION

2.1. Description of Equipment Under Test

Applicant	Funai Electric R & D (Shenzhen) Co., Ltd.
Applicant Address	B303 Technology Building II, 1057 Nanhai Road, Nanshan District, Shenzhen, China 518067
Manufacturer	Funai Electric R & D (Shenzhen) Co., Ltd.
Manufacturer Address	B303 Technology Building II, 1057 Nanhai Road, Nanshan District, Shenzhen, China 518067
Factory	Funai (Thailand) Company Limited
Factory Address	835 Moo18, Pakchong-Lumsompung Road, Tambon, Chantuek, Amphur Pakchong, Nakhon Ratchasima 30130, Thailand
Product	WiFi module
Model No.	U9W43
IC	25625-U9W43
Sample Type	Prototype production
Date of Receipt	Nov.30,2021
Date of Test	Dec.08, 2021~Jan.08, 2022
Remark: This report only for BDR+EDR.	

2.2. Feature of Equipment Under Test

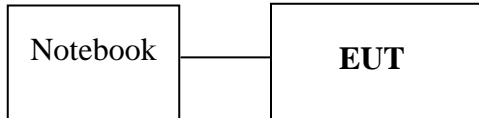
Product Feature & Specification		
Product	WiFi module	
Model No.	U9W43	
Radio	IEEE802.11 a/b/g/n/ac	
Power Source	<input type="checkbox"/> Commercial Power	AC 100 ~ 240V
	<input checked="" type="checkbox"/> External Power Source	DC 5V
	<input type="checkbox"/> Lithium battery	DC V, mAh
	<input type="checkbox"/> UM battery	DC V
Bluetooth		
Radio	BDR +EDR; BLE	
Frequency Range	2402-2480MHz	
Type of Modulation	GFSK, $\pi/4$ DQPSK, 8DPSK	
Data Rate	1Mbps, 2Mbps, 3Mbps	
Quantity of Channels	79/40	
Channel Separation	1MHz/2MHz	
2.4GHz Wi-Fi		
Support Modes	802.11b/g/n20/n40	
Frequency Range	2412-2462MHz	
Type of Modulation	802.11b(DSSS): CCK, QPSK, BPSK; 802.11g/n(OFDM): 64QAM, 16QAM, QPSK, BPSK	
Data Rate	802.11b: 1/2/5.5/11 Mbps; 802.11g: 6/9/12/18/24/36/48/54 Mbps; 802.11n: up to 300Mbps	
Channel Separation	5MHz	
5GHz Wi-Fi		
Support Modes	802.11a/n20/n40/ac20/ac40/ac80	
Frequency Range	5180-5240MHz, 5745-5825MHz	
Type of Modulation	802.11a/n (OFDM): QPSK, BPSK, 16QAM, 64QAM 802.11ac (OFDM): QPSK, BPSK, 16QAM, 64QAM, 256QAM	
Data Rate	802.11a: 6/9/12/18/24/36/48/54 Mbps; 802.11n: up to 300Mbps; 802.11ac: up to 867Mbps	
Channel Separation	5MHz	

Antenna System	
Type of Antenna	Bluetooth Antenna: External PCB Antenna WIFI Antenna: monopole Antenna
Antenna Peak Gain	Bluetooth Peak Gain: -0.42dBi DTS Band Peak Gain: ANT A: -1.04dBi; ANT B: -2.61dBi. U-NII-1 Band Peak Gain: ANT A: 1.42dBi; ANT B: 1.25dBi. U-NII-3 Band Peak Gain: ANT A: 0.98dBi; ANT B: -0.28dBi.

2.3. Tested Supporting System Details

No.	Description	ACS No.	Manufacturer	Model	Serial Number
1.	Notebook	N/A	acer	ZOW	NVX7C
		USB Cable: Shielded, Detachable, 1.0m			

2.4. Block Diagram of connection between EUT and simulators



(EUT: WiFi module)

2.5. Test information

A special software (COM-WCN Combo Tool Version: W1942) was used to control EUT work in continuous TX mode

Tested mode, Packet Type, peak output power information			
Mode	Packet Type	Output power(dBm) P max	Output Power(dBm) P low
GFSK	DH1	11.018	10.143
	DH3		
	DH5		
$\pi/4$ DQPSK	2-DH1	10.124	9.986
	2-DH3		
	2-DH5		
8DPSK	3-DH1	10.959	10.167
	3-DH3		
	3-DH5		

$\pi/4$ DQPSK mode has been verified to have the lowest power, so the final test were performed with GFSK and 8DPSK mode, the worse-case packet type were:

GFSK Mode: DH5

8DPSK Mode: 3DH5

Item		Modulation	Data Rate	Test Channel
Radiated Test Case	Radiated Band Edge	GFSK	1Mbps	00/78
		8-DPSK	3Mbps	00/78
	Radiated Spurious Emission	GFSK	1Mbps	00/39/78
		8-DPSK	3Mbps	00/39/78
Conducted Test Case	20dB Bandwidth	GFSK	1Mbps	00/39/78
		8-DPSK	3Mbps	00/39/78
	Carrier Frequency Separation	GFSK	1Mbps	39
		8-DPSK	3Mbps	39
	Time of Occupancy	GFSK	1Mbps	39
		8-DPSK	3Mbps	39
	Number of Hopping Channels	GFSK	1Mbps	39
		8-DPSK	3Mbps	39
	Maximum Peak Output Power	GFSK	1Mbps	00/39/78
		8-DPSK	3Mbps	00/39/78
	Band Edges	GFSK	1Mbps	00/78
		8-DPSK	3Mbps	00/78
Spurious Emission	GFSK	1Mbps	00/39/78	
	8-DPSK	3Mbps	00/39/78	

2.6. Test Facility

Site Description

Name of Firm	:	Audix Technology (Shenzhen) Co., Ltd. No. 6, Kefeng Road, Science & Technology Park, Nanshan District , Shenzhen, Guangdong, China
EMC Lab.	:	Accredited by Industry Canada Registration Number: IC 5183A-1 Valid Date: Mar.31, 2022 Certificated by FCC, USA Designation No.: CN5022 Valid Date: Mar.31, 2022 Accredited by NVLAP, USA NVLAP Code: 200372-0 Valid Date: Mar.31, 2022

2.7. Measurement Uncertainty (95% confidence levels, k=2)

Test Item	Uncertainty
Uncertainty for Conduction emission test in No. 1 Conduction	2.6dB(150KHz to 30MHz)
Uncertainty for Radiation Emission test in 3m chamber	3.2dB(30~200MHz, Polarization: H)
	3.6dB(30~200MHz, Polarization: V)
	3.4dB(200M~1GHz, Polarization: H)
	3.4dB(200M~1GHz, Polarization: V)
Uncertainty for Radiation Emission test in 3m chamber(1GHz-25GHz)	5.0dB(1~6GHz, Distance: 3m)
	5.2dB(6~25GHz, Distance: 3m)
Uncertainty for Radiated Spurious Emission test in RF chamber	3.7dB(30MHz~1000MHz)
	3.3dB(1~26.5GHz)
Uncertainty for Conduction Spurious emission test	2.0dB
Uncertainty for Output power test	0.8dB
Uncertainty for Bandwidth test	83kHz
Uncertainty for DC power test	1%
Uncertainty for test site temperature and humidity	0.6°C
	3%

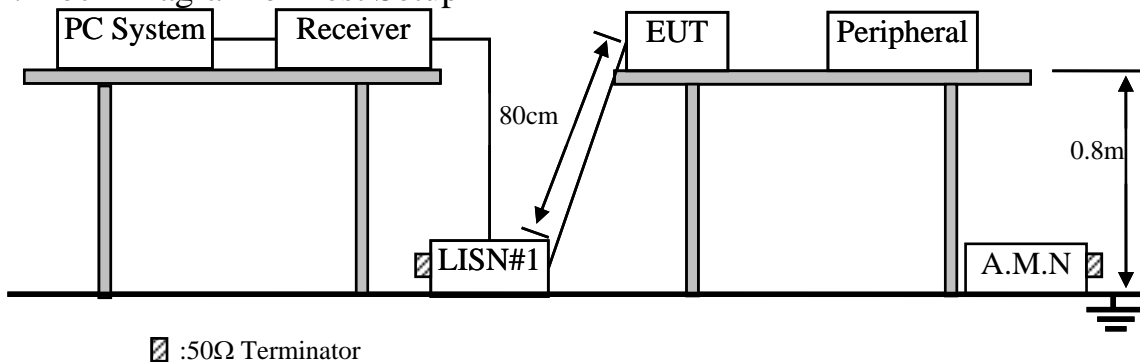
3. POWER LINE CONDUCTED EMISSION TEST

3.1. Test Equipments

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	1# Shielding Room	AUDIX	N/A	N/A	May.17,18	5 Year
2.	EMI Test Receiver	Rohde & Schwarz	ESCI	100842	Apr.07,21	1 Year
3.	L.I.S.N.#1	Rohde & Schwarz	ENV216	102160	Oct.09,21	1 Year
4.	A.M.N	Kyoritsu	KNW-403D	8-1750-2	Apr.07,21	1 Year
5.	Terminator	Hubersuhner	50Ω	No.1	Apr.06,21	1 Year
6.	Terminator	Hubersuhner	50Ω	No.2	Apr.06,21	1 Year
7.	RF Cable	EMCI	EMCCFD300-BM-NM-2000	190422	Apr.08,21	1 Year
8.	Test Software	AUDIX	e3	6.100913a	N/A	N/A

Note: N/A means Not applicable.

3.2. Block Diagram of Test Setup



3.3. Power Line Conducted Emission Test Limits

Frequency	Maximum RF Line Voltage	
	Quasi-Peak Level dB(μV)	Average Level dB(μV)
150kHz ~ 500kHz	66 ~ 56*	56 ~ 46*
500kHz ~ 5MHz	56	46
5MHz ~ 30MHz	60	50

Notes: 1. * Decreasing linearly with logarithm of frequency.

2. The lower limit shall apply at the transition frequencies.

3. Emission Level (dBμV) = Factor (L.I.S.N.) (dB) + Cable Loss (dB)+Reading (Receiver) (dBμV)

3.4. Configuration of EUT on Test

The following equipment are installed on Power Line Conducted Emission Test to meet the commission requirement and operating regulations in a manner which tends to maximize its emission characteristics in a normal application.

3.4.1. WiFi module (EUT)

Model No. : U9W43

Serial No. : N/A

3.4.2. Support Equipment: As Tested Supporting System Details, in Section 2.2.

3.5. Operating Condition of EUT

- 3.5.1. Setup the EUT as shown as Section 3.2.
- 3.5.2. Turn on the power of EUT.
- 3.5.3. PC run test software to control EUT work in Tx mode.

3.6. Test Procedure

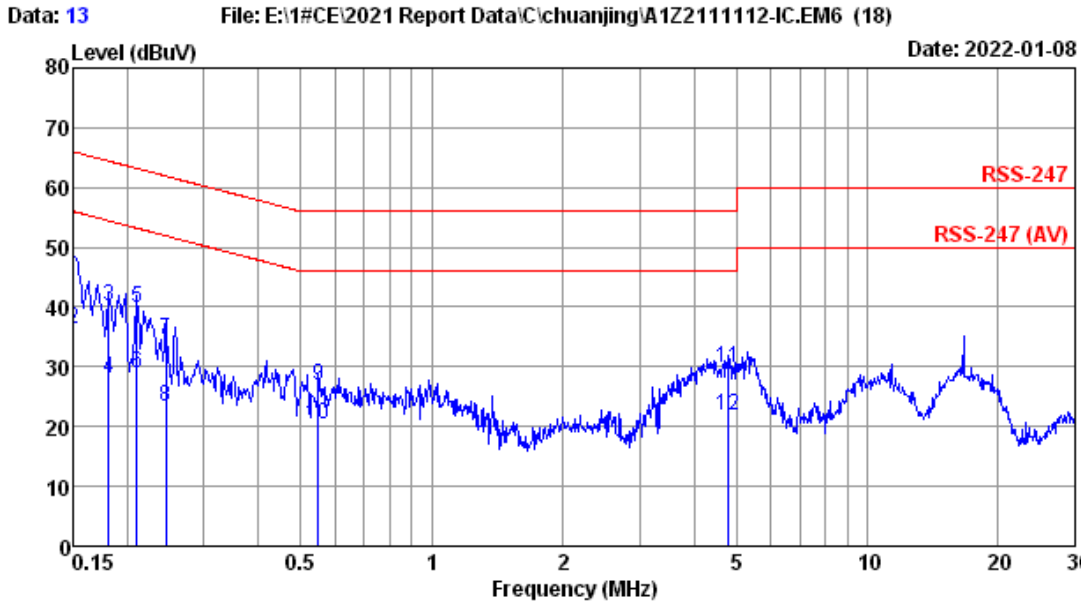
The EUT was placed on a non-metallic table, 80cm above the ground plane. The EUT Power Via AC unit connected to the power mains through a line impedance stabilization network (L.I.S.N. #1). This provides a 50 ohm coupling impedance for the EUT (Please refer the block diagram of the test setup and photographs). The AC line are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to ANSI C63.10: 2020 on Conducted Emission Test.

The bandwidth of test receiver (R & S ESCI) is set at 9kHz.

The frequency range from 150kHz to 30MHz is checked.

3.7. Power Line Conducted Emission Test Results

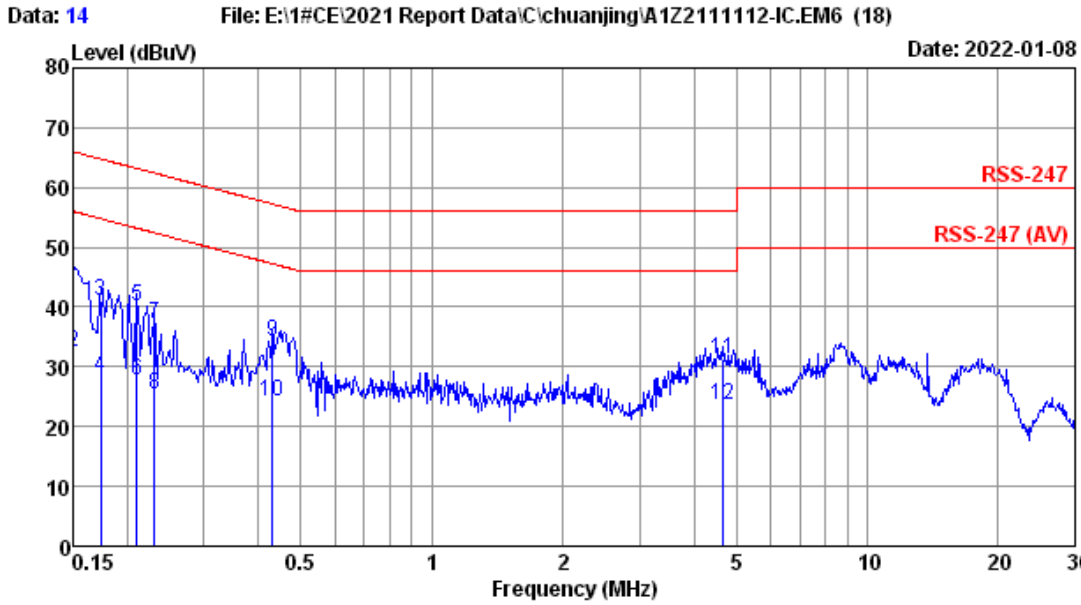
PASS. (All emissions not reported below are too low against the prescribed limits.)



Site no :1# Conduction Data No :13
 Dis./Lisn :2021 ENV216-L LISN phase:
 Limit :RSS-247
 Env./Ins. :24.3*C/45% Engineer :Evan
 EUT :U9W43
 Power Rating :AC 120V/60Hz
 Test Mode :BT3.0Tx Mode

No	Freq (MHz)	LISN Factor (dB)	Cable loss (dB)	Reading (dBuV)	Emission Level (dBuV)	Limits (dBuV)	Margin (dB)	Remark
1	0.150	9.50	0.01	37.29	46.80	66.00	19.20	QP
2	0.150	9.50	0.01	26.80	36.31	56.00	19.69	Average
3	0.182	9.50	0.01	30.71	40.22	64.42	24.20	QP
4	0.182	9.50	0.01	18.60	28.11	54.42	26.31	Average
5	0.211	9.50	0.01	30.49	40.00	63.18	23.18	QP
6	0.211	9.50	0.01	19.40	28.91	53.18	24.27	Average
7	0.246	9.50	0.01	25.11	34.62	61.91	27.29	QP
8	0.246	9.50	0.01	13.70	23.21	51.91	28.70	Average
9	0.549	9.50	0.01	17.34	26.85	56.00	29.15	QP
10	0.549	9.50	0.01	10.80	20.31	46.00	25.69	Average
11	4.797	9.60	0.04	20.18	29.82	56.00	26.18	QP
12	4.797	9.60	0.04	12.30	21.94	46.00	24.06	Average

Remarks: 1.Emission Level=LISN Factor+Cable Loss+Reading.
 2.If the average limit is met when using a quasi-peak detector, the EUT shall be deemed to meet both limits and measurement with average detector is unnecessary.



Site no	:1# Conduction	Data No	:14
Dis./Lisn	:2021 ENV216-N	LISN phase:	
Limit	:RSS-247	Engineer	:Evan
Env./Ins.	:24.3*C/45%		
EUT	:U9W43		
Power Rating	:AC 120V/60Hz		
Test Mode	:BT3.0Tx Mode		

No	Freq (MHz)	LISN Factor (dB)	Cable loss (dB)	Reading (dBuV)	Emission Level (dBuV)	Limits (dBuV)	Margin (dB)	Remark
1	0.150	10.00	0.01	34.69	44.70	66.00	21.30	QP
2	0.150	10.00	0.01	22.60	32.61	56.00	23.39	Average
3	0.174	10.00	0.01	30.97	40.98	64.77	23.79	QP
4	0.174	10.00	0.01	18.40	28.41	54.77	26.36	Average
5	0.211	10.01	0.01	30.06	40.08	63.18	23.10	QP
6	0.211	10.01	0.01	17.60	27.62	53.18	25.56	Average
7	0.230	10.01	0.01	27.18	37.20	62.44	25.24	QP
8	0.230	10.01	0.01	15.30	25.32	52.44	27.12	Average
9	0.431	10.08	0.01	24.09	34.18	57.24	23.06	QP
10	0.431	10.08	0.01	14.20	24.29	47.24	22.95	Average
11	4.672	10.20	0.04	21.02	31.26	56.00	24.74	QP
12	4.672	10.20	0.04	13.50	23.74	46.00	22.26	Average

Remarks: 1.Emission Level=LISN Factor+Cable Loss+Reading.
 2.If the average limit is met when using a quasi-peak detector, the EUT shall be deemed to meet both limits and measurement with average detector is unnecessary.

4. RADIATED EMISSION MEASUREMENT

4.1. Test Equipments

Frequency range: 30~1000MHz

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	3#Chamber(NSA)	AUDIX	N/A	N/A	May.02,21	1 Year
2.	3#Chamber(SE)	AUDIX	N/A	N/A	May.17,18	5 Year
3.	Signal Analyzer	Rohde & Schwarz	FSV30	104050	Apr.07,21	1 Year
4.	EMI Test Receiver	Rohde & Schwarz	ESR3	102891	Oct.20,21	1 Year
5.	Amplifier	HP	8447D	2944A11159	Apr.07,21	1 Year
6.	Tri-log-Broadband Antenna	SCHWARZBECK	VULB 9168	710	Dec.13,21	1 Year
7.	NSA Cable	HUBER+SUHNER	CFD400NL-LW	No.3	Oct.09,21	1 Year
8.	Coaxial Switch	Anritsu	MP59B	6201397223	Apr.07,21	1 Year
9.	Test Software	AUDIX	e3	6.100913a	N/A	N/A

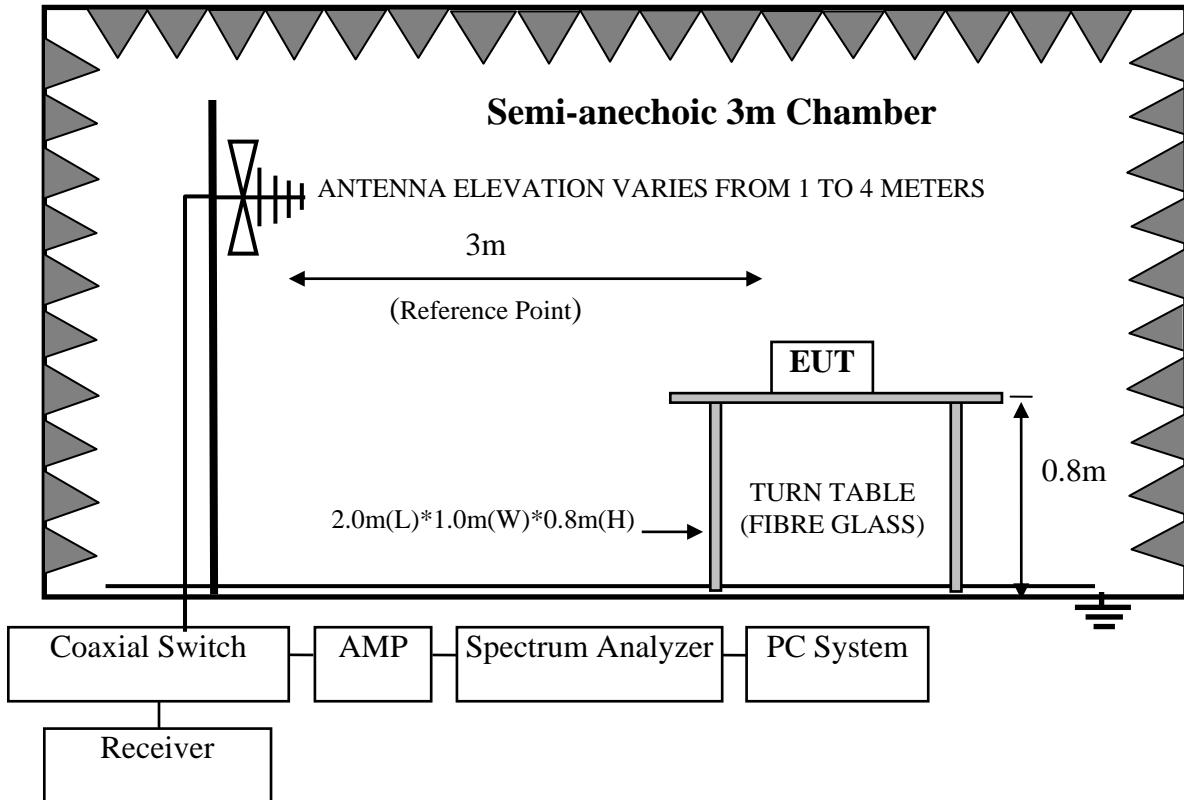
Note: N/A means Not applicable.

4.1.1. Frequency range: above 1000MHz

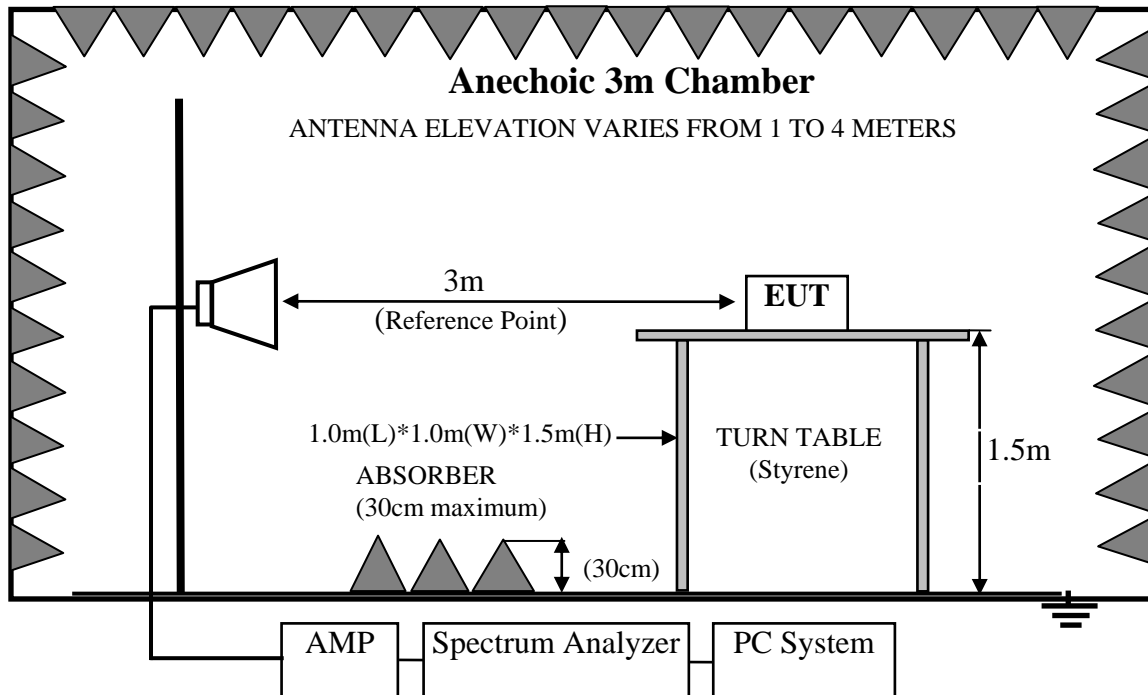
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	3#Chamber(Svswr)	AUDIX	N/A	N/A	Apr.14,21	1 Year
2.	3#Chamber(SE)	AUDIX	N/A	N/A	May.17,18	5 Year
3.	Signal Analyzer	Rohde & Schwarz	FSV30	104050	Apr.07,21	1 Year
4.	Horn Antenna	ETC	MCTD 1209	DRH15F03006	Jul.26,21	1 Year
5.	Horn Antenna	ETS	3116	00060089	Jan.08,22	1 Year
6.	Amplifier	Agilent	83017A	MY53270084	Oct.09,21	1 Year
7.	RF Cable	EMCI	EMC104-SM-S M-15000	190407	Jul.14,21	1 Year
8.	Test Software	AUDIX	e3	6.100913a	N/A	N/A

Note: N/A means Not applicable.

4.2. Block Diagram of Test Setup
For frequency range 30MHz-1000MHz



For frequency range 1GHz-25GHz



4.3. Radiated Emission Limits Standard:

FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMIT	
		$\mu\text{V}/\text{m}$	$\text{dB}(\mu\text{V})/\text{m}$
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
960 ~ 1000	3	500	54.0
Above 1000MHz	3	74.0 $\text{dB}(\mu\text{V})/\text{m}$ (Peak) 54.0 $\text{dB}(\mu\text{V})/\text{m}$ (Average)	

- Remark :
- (1) Emission Level ($\text{dB}\mu\text{V}/\text{m}$) = Reading (Receiver) ($\text{dB}\mu\text{V}$) + Antenna Factor (dB/m) + Cable Loss (dB)
 Emission Level ($\text{dB}\mu\text{V}/\text{m}$) = Reading (Spectrum) ($\text{dB}\mu\text{V}$) + Antenna Factor (dB/m) – Amp Factor (dB) + Cable Loss (dB)(above 1000MHz)
 - (2) The smaller limit shall apply at the cross point between two frequency bands.
 - (3) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.
 - (4) The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak 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.

4.4. EUT Configuration on Test

The following equipment are installed on Radiated Emission Test to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

4.4.1. WiFi module (EUT)

Model Number : U9W43
 Serial Number : N/A

4.5. Operating Condition of EUT

- 4.5.1. Setup the EUT and simulator as shown as Section 4.2.
- 4.5.2. Turn on the power of all equipments.
- 4.5.3. Let EUT work in Tx mode.

4.6. Test Procedure

Frequency below 30MHz:

The EUT setup on the turn table which has 0.8 m height to the ground. The turn table rotated 360 degrees and antenna fixed to 1 m to find the maximum emission level. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10: 2020 regulation.

EUT and its simulators are placed on a turn table, which is 0.8 meter high above ground for frequency 30MHz~1000MHz, 1.5 meter high above ground for frequency above 1GHz and put the absorbing with 2.4m(L)*2.4m(W)*0.3m(H) on the ground . The turn table can rotate 360 degrees to determine the position of the maximum emission level. Power on the EUT and let it working in test mode, then test it. EUT is set 3 meters away from the receiving antenna, which is mounted on a antenna tower. The antenna can be moved up and down between 1 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated bilog antenna) is used as receiving antenna for frequency 30MHz~1000MHz, and the Horn antenna is used as receiving antenna for frequency above 1GHz. Both horizontal and vertical polarization of the antenna is set on Test. In order to find the maximum emission levels, all of the interface cables must be manipulated according to ANSI C63.10: 2020 on radiated emission Test.

This test was performed with EUT in X, Y, Z position, and the worse case was found reported in report.

The bandwidth of the EMI test receiver (R&S ESR7) is set at 120kHz for frequency range from 30MHz to 1000 MHz.

The bandwidth of the Spectrum's RBW is set at 1MHz and VBW is set at 3MHz for peak emissions measurement above 1GHz

This device is pulse Modulated, a duty cycle factor was used to calculated average level based measured peak level.

The frequency range from 30MHz to 10th harmonic (25GHz) are checked. and no any emissions were found from 18GHz to 25 GHz, So the radiated emissions from 18GHz to 25GHz were not record.

4.7. Radiated Emission Test Results

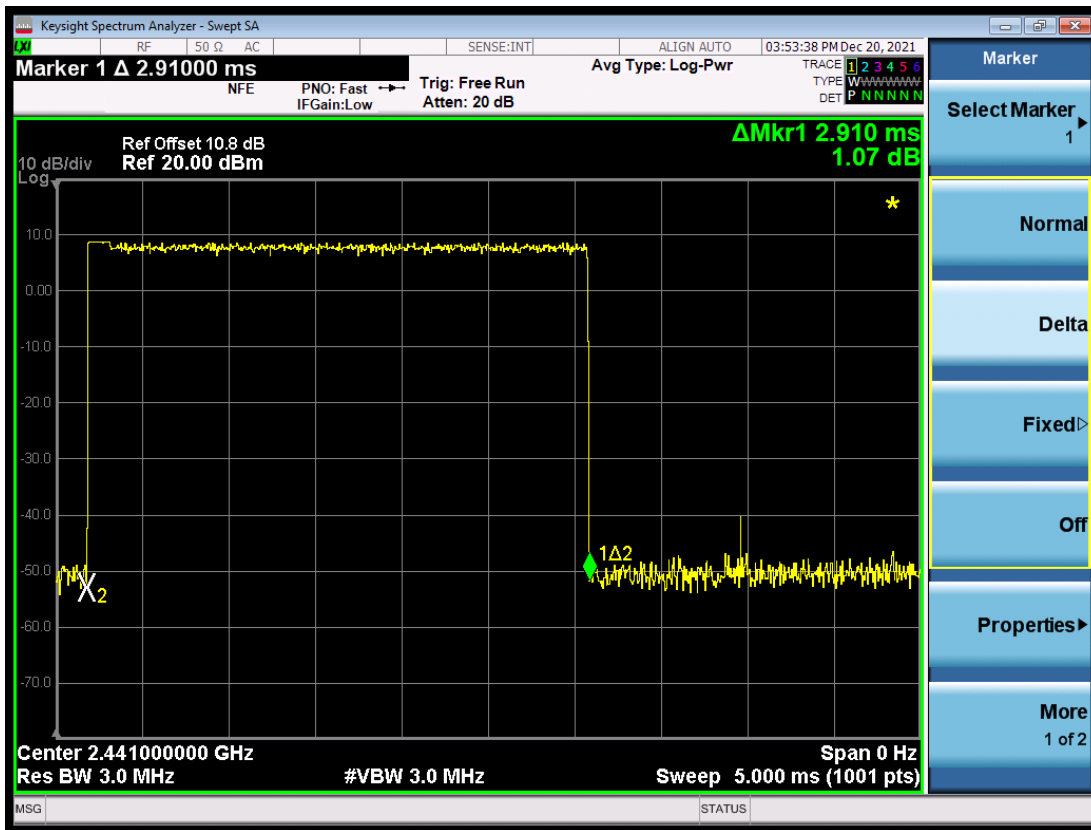
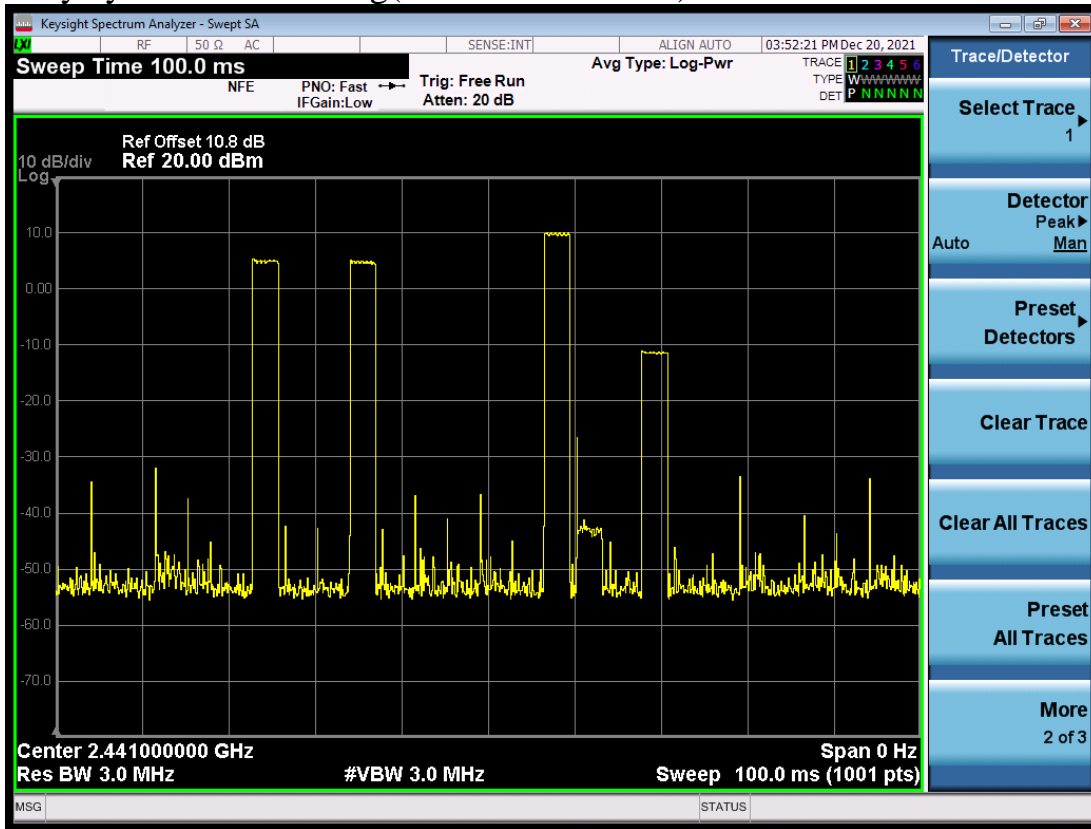
PASS.

All the emissions from 30MHz to 25GHz were comply with the RSS-247 Limit.

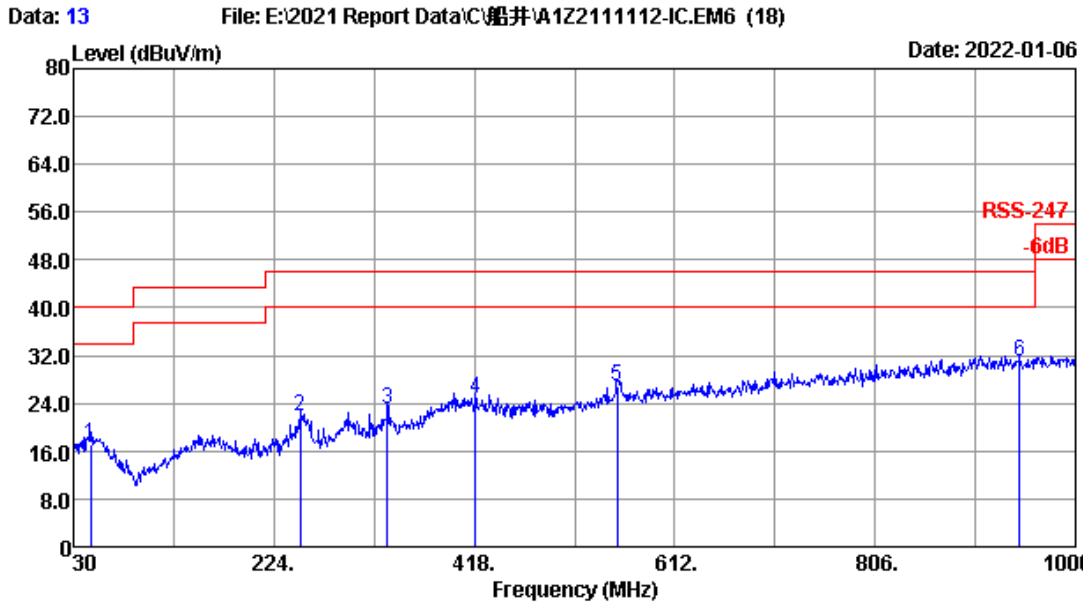
Note 1: The duty cycle factor for calculate average level is -18.681dB, and average limit is 20dB below peak limit, so if peak measured level comply with average limit, the average level was deemed to comply with average limit.

Note 2: The emissions (9kHz~30MHz) not reported for there is no emission be found.

Duty cycle factor = $20\log(\text{Dwell time}/100\text{ms}) = -18.681\text{dB}$



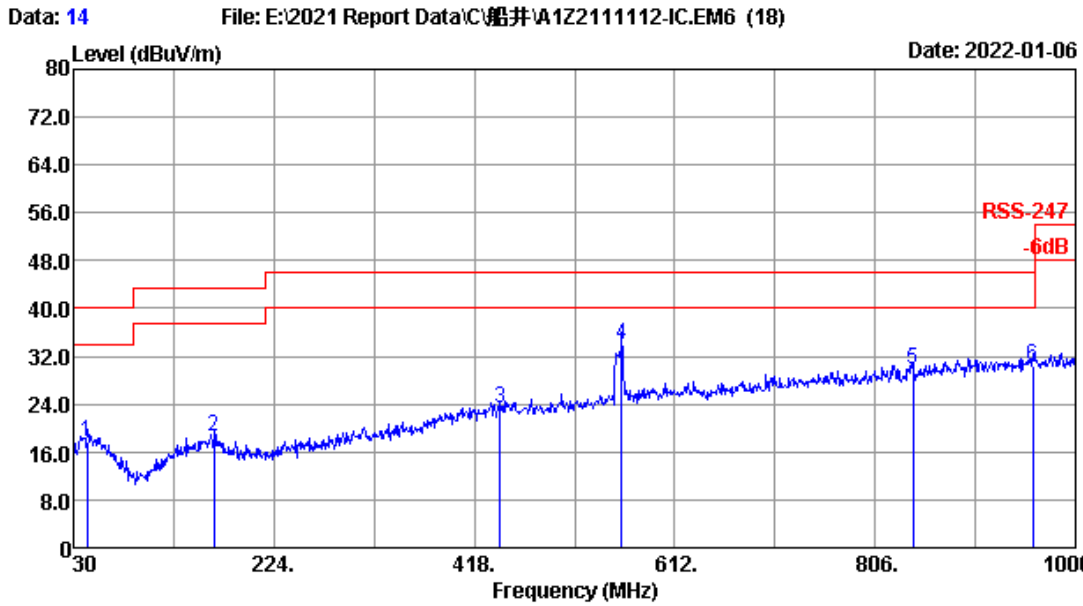
Frequency: 30MHz~1GHz



Site no. : 3m Chamber Data no. : 13
 Dis. / Ant. : 3m 2021 VULB9168-710 Ant. pol. : HORIZONTAL
 Limit : RSS-247
 Env. / Ins. : 22.1°C/47% Engineer : Abel
 EUT :
 Power rating :
 Test Mode : BT3.0 TX Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	46.490	20.30	0.74	-3.93	17.11	40.00	22.89	QP
2	249.220	18.28	1.57	2.00	21.85	46.00	24.15	QP
3	333.610	20.47	1.85	0.63	22.95	46.00	23.05	QP
4	418.970	22.64	2.08	-0.07	24.65	46.00	21.35	QP
5	556.710	25.05	2.48	-0.59	26.94	46.00	19.06	QP
6	945.680	29.66	3.47	-2.16	30.97	46.00	15.03	QP

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
 2. The emission levels that are 20dB below the official limit are not reported.

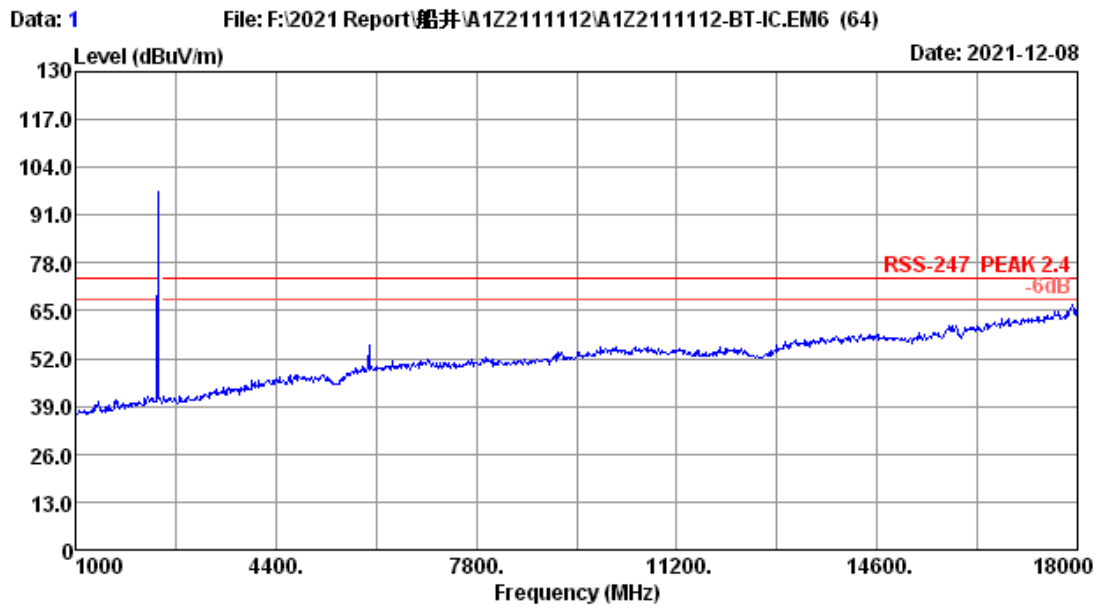


Site no. : 3m Chamber Data no. : 14
 Dis. / Ant. : 3m 2021 VULB9168-710 Ant. pol. : VERTICAL
 Limit : RSS-247
 Env. / Ins. : 22.1°C/47% Engineer : Abel
 EUT :
 Power rating :
 Test Mode : BT3.0 TX Mode

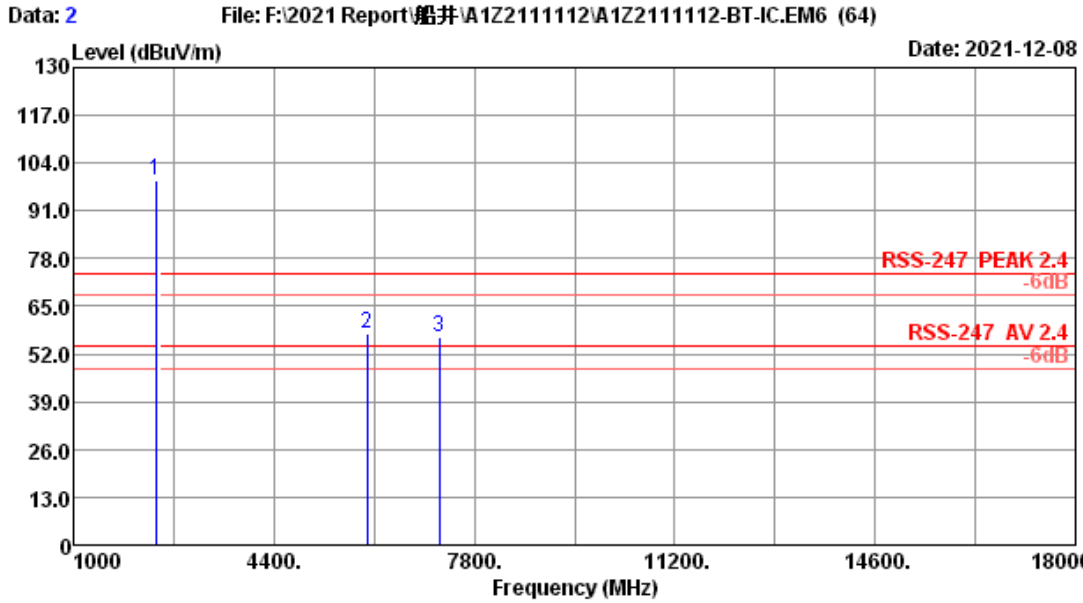
No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	43.580	20.30	0.73	-3.18	17.85	40.00	22.15	QP
2	165.800	19.42	1.29	-2.20	18.51	43.50	24.99	QP
3	443.220	23.31	2.16	-2.04	23.43	46.00	22.57	QP
4	560.590	25.13	2.49	6.33	33.95	46.00	12.05	QP
5	842.860	28.43	3.23	-1.91	29.75	46.00	16.25	QP
6	958.290	29.77	3.51	-2.91	30.37	46.00	15.63	QP

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
 2. The emission levels that are 20dB below the official limit are not reported.

Frequency: 1GHz~18GHz



Site no.	: 3m Chamber	Data no.	: 1
Dis. / Ant.	: 3m 2021 MCTD1209-3006	Ant. pol.	: VERTICAL
Limit	: RSS-247 PEAK 2.4		
Env. / Ins.	: 22.1°C/51.5%	Engineer	: Lynn
Test Mode	: BT3.0 GFSK 2402MHz Tx		

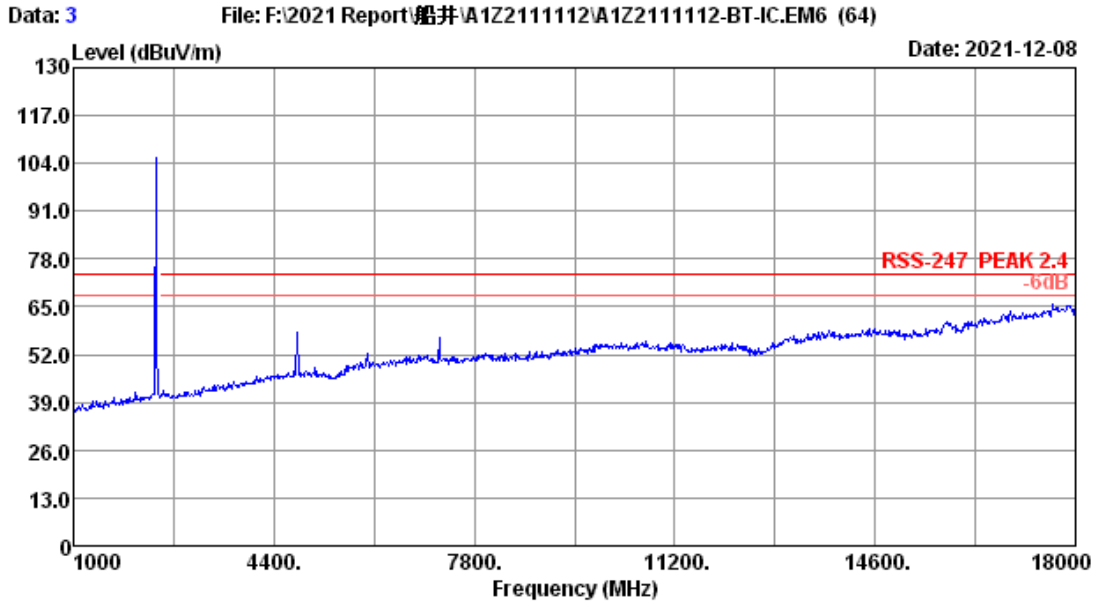


Site no. : 3m Chamber Data no. : 2
 Dis. / Ant. : 3m 2021 MCTD1209-3006 Ant. pol. : VERTICAL
 Limit : RSS-247 PEAK 2.4
 Env. / Ins. : 22.1°C/51.5% Engineer : Lynn
 Test Mode : BT3.0 GFSK 2402MHz Tx

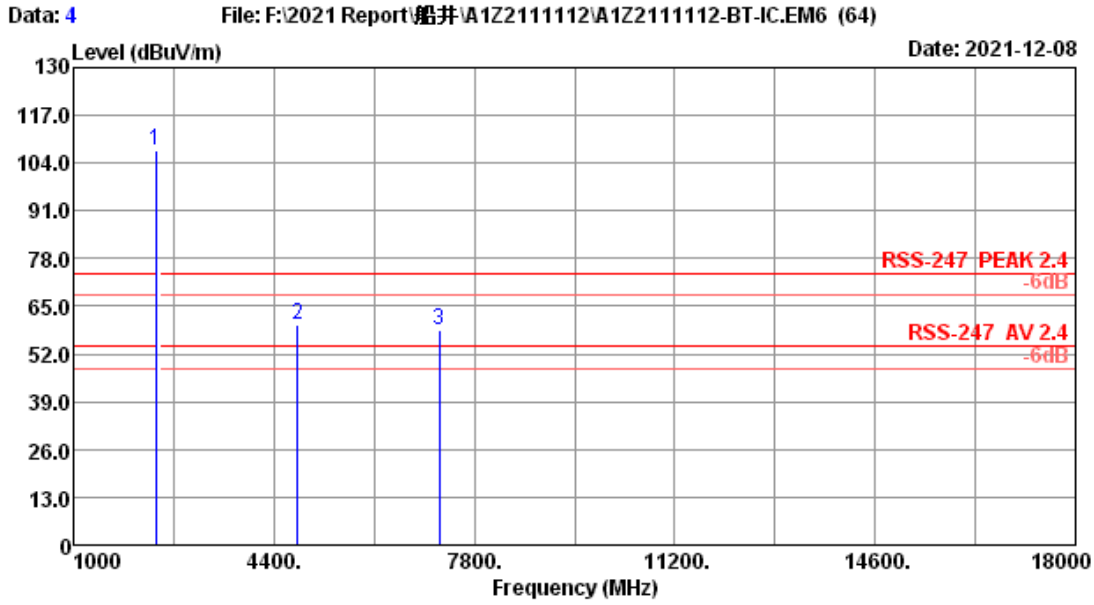
No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2402.00	27.89	3.66	102.99	35.24	99.30	-----	-----	Peak
2	5981.00	34.47	5.39	52.41	34.50	57.77	74.00	16.23	Peak
3	7206.00	36.07	5.28	49.81	34.70	56.46	74.00	17.54	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading - Amp factor.
 2. The emission levels that are 20dB below the official limit are not reported.

Frequency (MHz)	Peak level (dBuV/m)	Duty cycle factor (dB)	AV level (dBuV/m)	Limit(dBuV/m)	Conclusion
5981.00	57.77	-18.681	39.089	54	Pass
7206.00	56.46	-18.681	37.779	54	Pass



Site no.	: 3m Chamber	Data no.	: 3
Dis. / Ant.	: 3m 2021 MCTD1209-3006	Ant. pol.	: HORIZONTAL
Limit	: RSS-247 PEAK 2.4		
Env. / Ins.	: 22.1°C/51.5%	Engineer	: Lynn
Test Mode	: BT3.0 GFSK 2402MHz Tx		

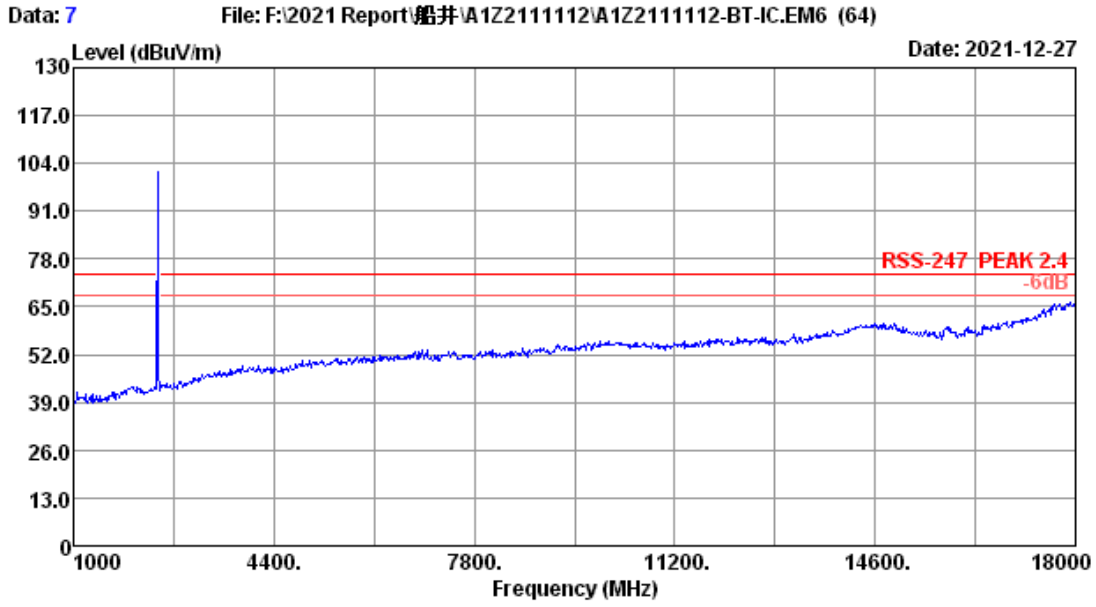


Site no. : 3m Chamber Data no. : 4
 Dis. / Ant. : 3m 2021 MCTD1209-3006 Ant. pol. : HORIZONTAL
 Limit : RSS-247 PEAK 2.4
 Env. / Ins. : 22.1°C/51.5% Engineer : Lynn
 Test Mode : BT3.0 GFSK 2402MHz Tx

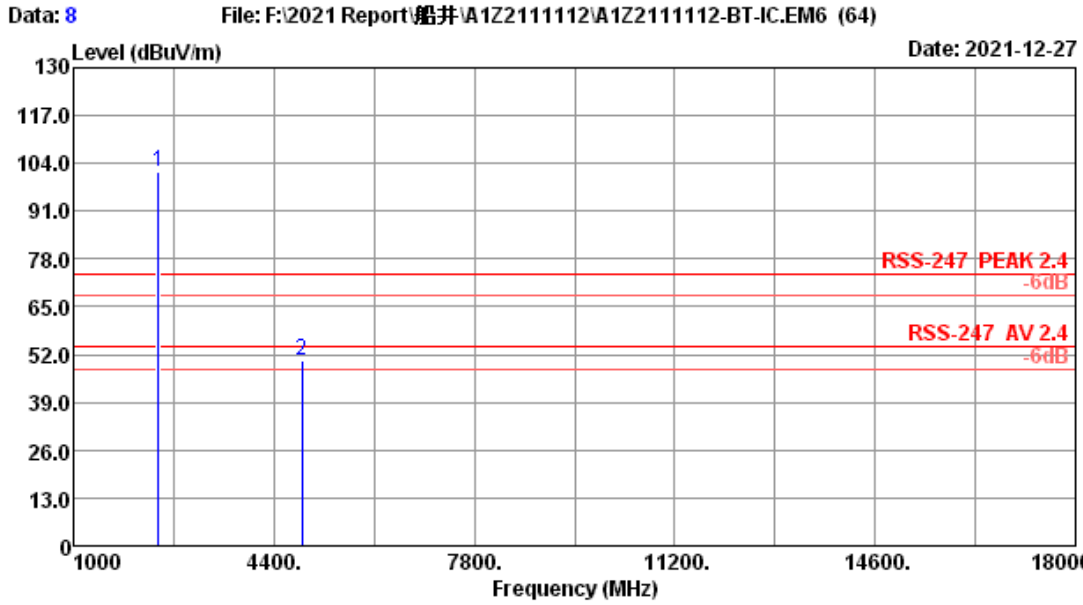
No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2402.00	27.89	3.66	111.09	35.24	107.40	-----	-----	Peak
2	4804.00	32.69	4.98	56.98	34.46	60.19	74.00	13.81	Peak
3	7206.00	36.07	5.28	51.65	34.70	58.30	74.00	15.70	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading - Amp factor.
 2. The emission levels that are 20dB below the official limit are not reported.

Frequency (MHz)	Peak level (dBuV/m)	Duty cycle factor (dB)	AV level (dBuV/m)	Limit(dBuV/m)	Conclusion
4804.00	60.19	-18.681	41.509	54	Pass
7206.00	58.30	-18.681	39.619	54	Pass



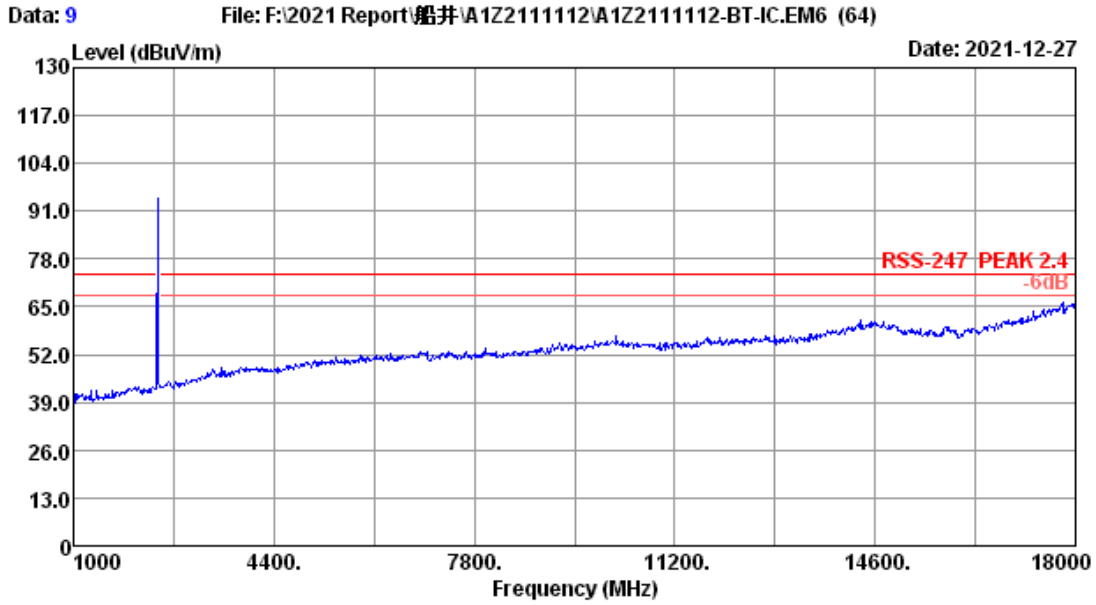
Site no.	: 3m Chamber	Data no.	: 7
Dis. / Ant.	: 3m 2021 MCTD1209-3006	Ant. pol.	: HORIZONTAL
Limit	: RSS-247 PEAK 2.4		
Env. / Ins.	: 22.1°C/51.5%	Engineer	: Lynn
Test Mode	: BT3.0 GFSK 2441MHz Tx		



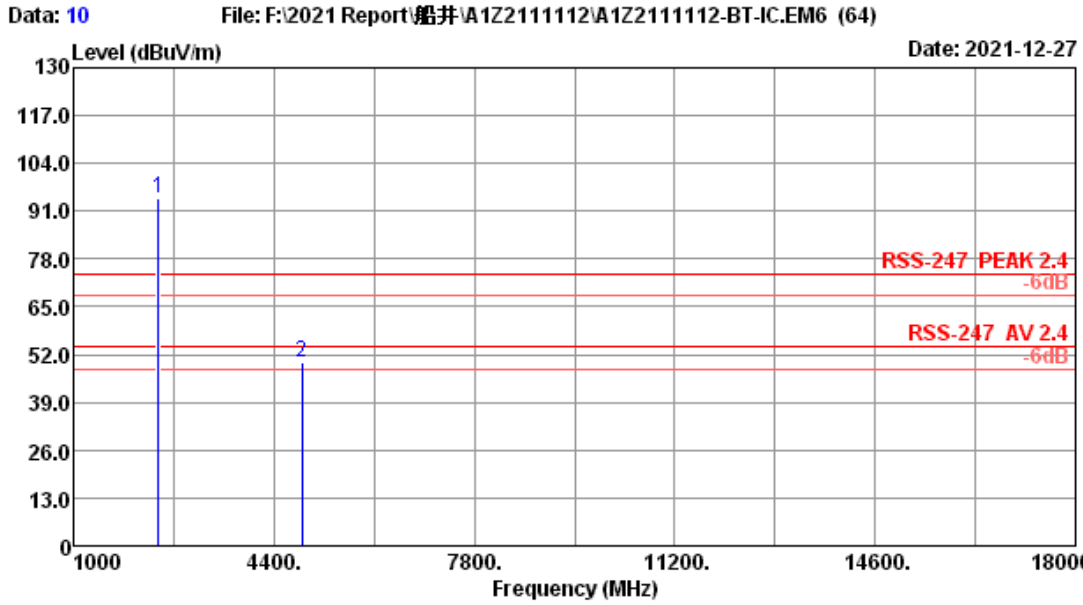
Site no. : 3m Chamber Data no. : 8
 Dis. / Ant. : 3m 2021 MCTD1209-3006 Ant. pol. : HORIZONTAL
 Limit : RSS-247 PEAK 2.4
 Env. / Ins. : 22.1°C/51.5% Engineer : Lynn
 Test Mode : BT3.0 GFSK 2441MHz Tx

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2441.00	28.00	3.68	105.05	35.25	101.48	74.00	27.48	Peak
2	4882.00	32.73	5.01	47.12	34.47	50.39	50.39	0.00	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading - Amp factor.
 2. The emission levels that are 20dB below the official limit are not reported.



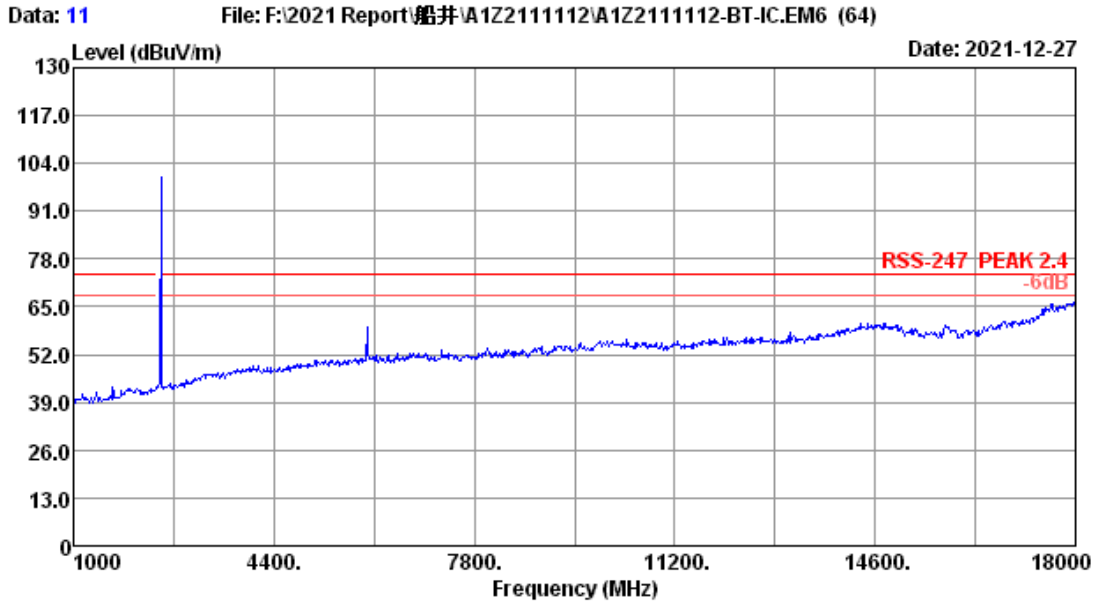
Site no.	: 3m Chamber	Data no.	: 9
Dis. / Ant.	: 3m 2021 MCTD1209-3006	Ant. pol.	: VERTICAL
Limit	: RSS-247 PEAK 2.4		
Env. / Ins.	: 22.1°C/51.5%	Engineer	: Lynn
Test Mode	: BT3.0 GFSK 2441MHz Tx		



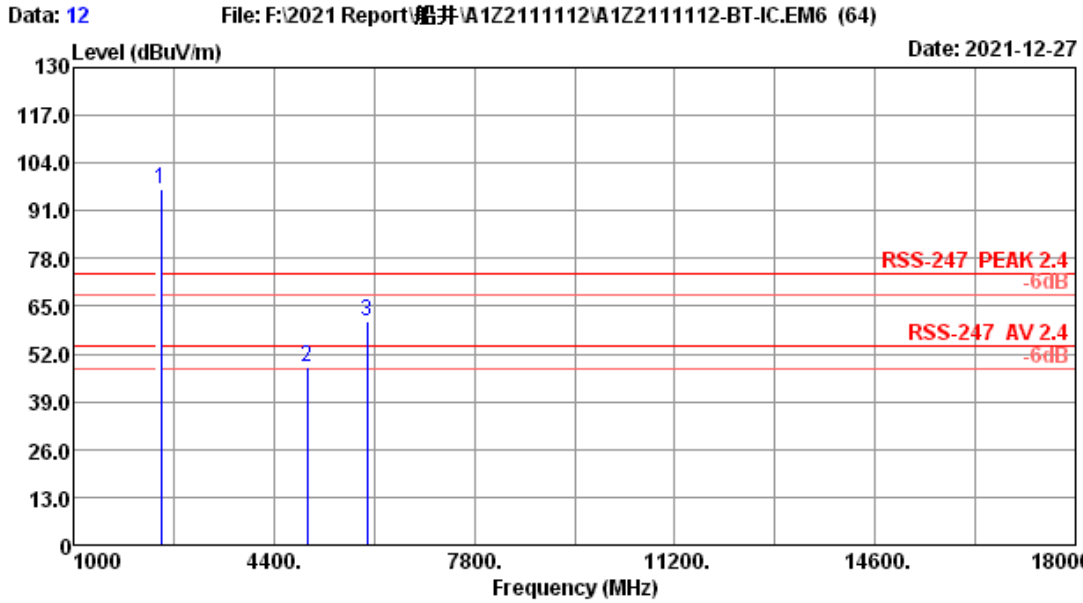
Site no. : 3m Chamber Data no. : 10
 Dis. / Ant. : 3m 2021 MCTD1209-3006 Ant. pol. : VERTICAL
 Limit : RSS-247 PEAK 2.4
 Env. / Ins. : 22.1°C/51.5% Engineer : Lynn
 Test Mode : BT3.0 GFSK 2441MHz Tx

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2441.00	28.00	3.68	98.19	35.25	94.62	74.00	20.62	Peak
2	4882.00	32.73	5.01	46.41	34.47	49.68	49.68	0.00	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading - Amp factor.
 2. The emission levels that are 20dB below the official limit are not reported.



Site no.	: 3m Chamber	Data no.	: 11
Dis. / Ant.	: 3m 2021 MCTD1209-3006	Ant. pol.	: VERTICAL
Limit	: RSS-247 PEAK 2.4		
Env. / Ins.	: 22.1°C/51.5%	Engineer	: Lynn
Test Mode	: BT3.0 GFSK 2480MHz Tx		

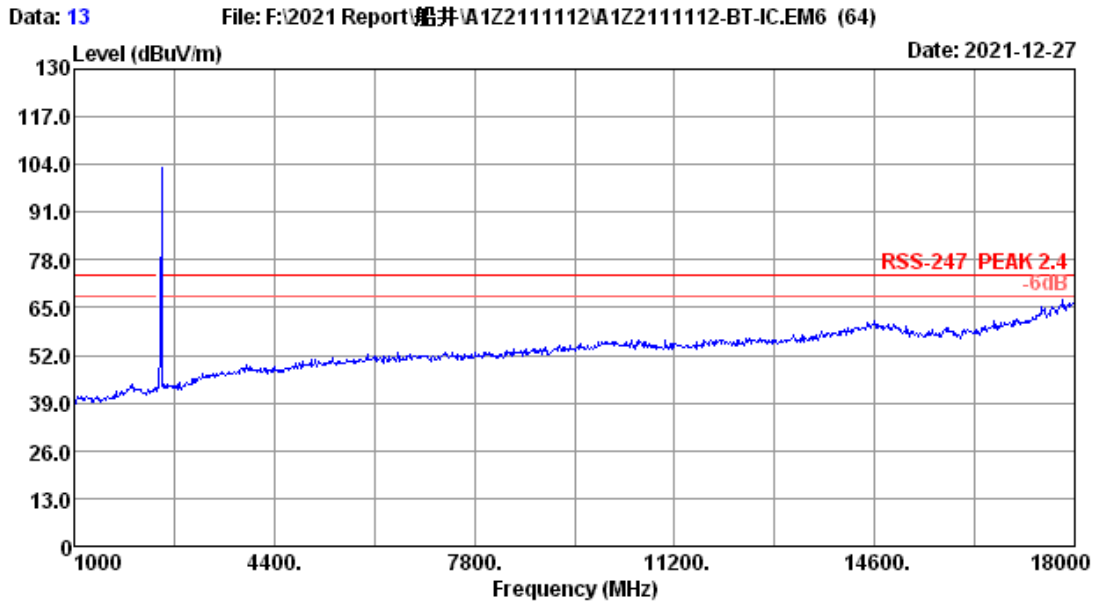


Site no. : 3m Chamber Data no. : 12
 Dis. / Ant. : 3m 2021 MCTD1209-3006 Ant. pol. : VERTICAL
 Limit : RSS-247 PEAK 2.4
 Env. / Ins. : 22.1°C/51.5% Engineer : Lynn
 Test Mode : BT3.0 GFSK 2480MHz Tx

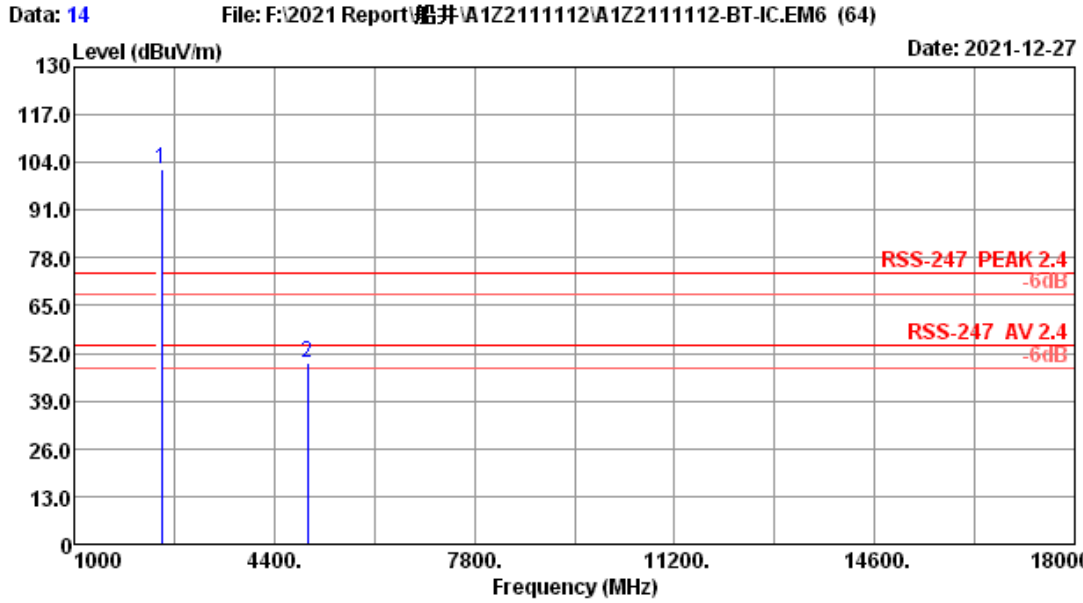
No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2480.00	28.07	3.71	100.59	35.25	97.12	-----	-----	Peak
2	4960.00	32.78	5.03	45.36	34.49	48.68	74.00	25.32	Peak
3	5981.00	34.47	5.39	55.48	34.50	60.84	74.00	13.16	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp factor.
 2. The emission levels that are 20dB below the official limit are not reported.

Frequency (MHz)	Peak level (dBuV/m)	Duty cycle factor (dB)	AV level (dBuV/m)	Limit(dBuV/m)	Conclusion
5981.00	60.84	-18.681	42.159	54	Pass



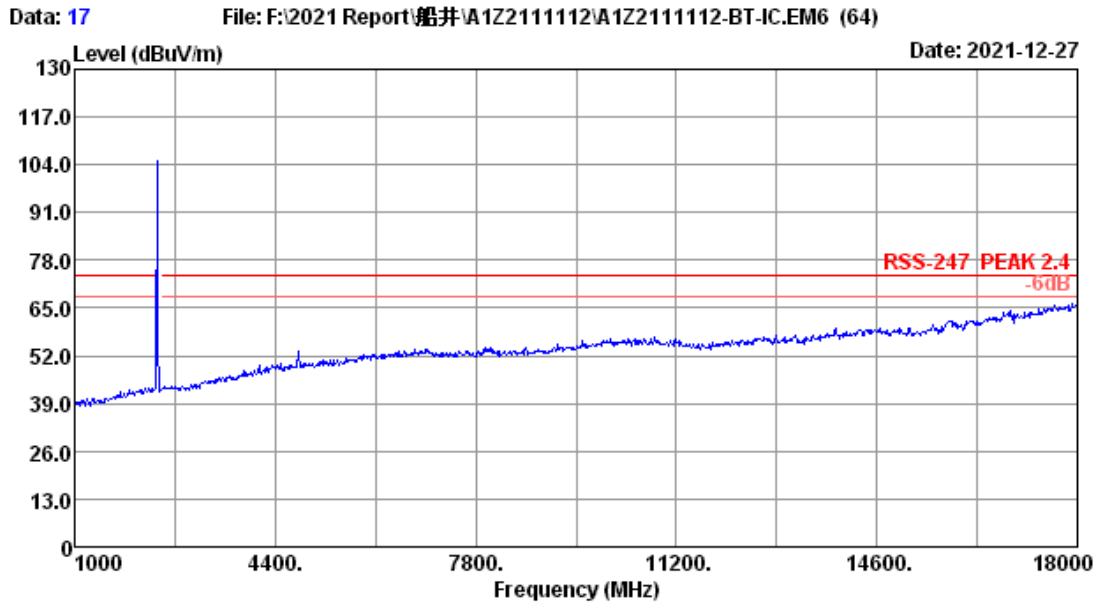
Site no.	: 3m Chamber	Data no.	: 13
Dis. / Ant.	: 3m 2021 MCTD1209-3006	Ant. pol.	: HORIZONTAL
Limit	: RSS-247 PEAK 2.4		
Env. / Ins.	: 22.1°C/51.5%	Engineer	: Lynn
Test Mode	: BT3.0 GFSK 2480MHz Tx		



Site no. : 3m Chamber Data no. : 14
 Dis. / Ant. : 3m 2021 MCTD1209-3006 Ant. pol. : HORIZONTAL
 Limit : RSS-247 PEAK 2.4
 Env. / Ins. : 22.1°C/51.5% Engineer : Lynn
 Test Mode : BT3.0 GFSK 2480MHz Tx

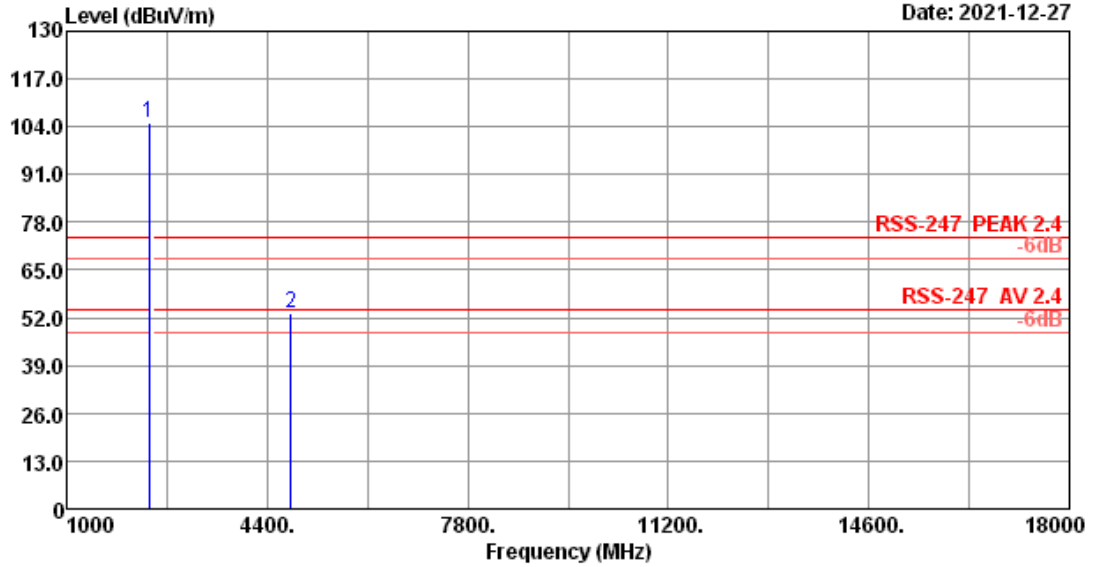
No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2480.00	28.07	3.71	105.62	35.25	102.15	-----	-----	Peak
2	4960.00	32.78	5.03	46.06	34.49	49.38	74.00	24.62	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp factor.
 2. The emission levels that are 20dB below the official limit are not reported.



Site no.	: 3m Chamber	Data no.	: 17
Dis. / Ant.	: 3m 2021 MCTD1209-3006	Ant. pol.	: HORIZONTAL
Limit	: RSS-247 PEAK 2.4		
Env. / Ins.	: 22.1°C/51.5%	Engineer	: Lynn
Test Mode	: BT3.0 8DPSK 2402MHz Tx		

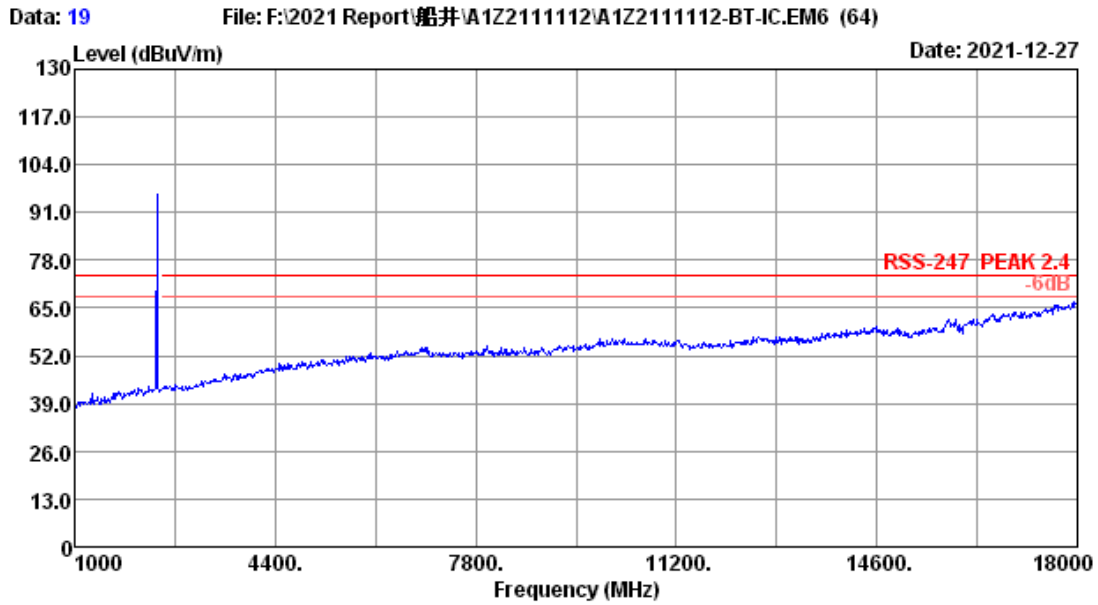
Data: 18 File: F:\2021 Report\船井\A1Z2111112\A1Z2111112-BT-IC.EM6 (64) Date: 2021-12-27



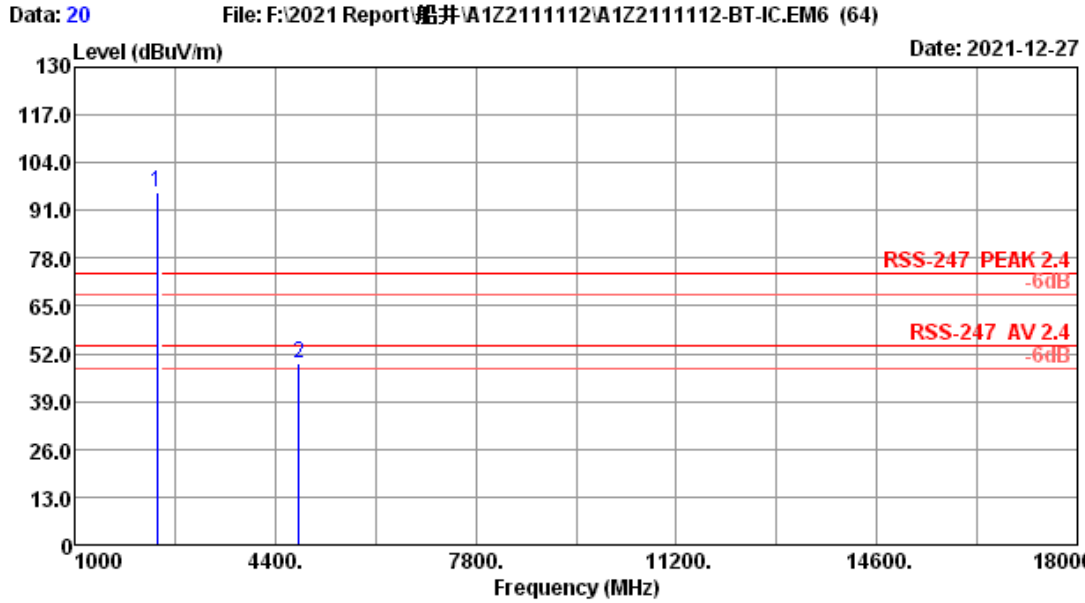
Site no. : 3m Chamber Data no. : 18
 Dis. / Ant. : 3m 2021 MCTD1209-3006 Ant. pol. : HORIZONTAL
 Limit : RSS-247 PEAK 2.4
 Env. / Ins. : 22.1°C/51.5% Engineer : Lynn
 Test Mode : BT3.0 8DPSK 2402MHz Tx

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2402.00	27.89	3.66	108.65	35.24	104.96	-----	-----	Peak
2	4804.00	32.69	4.98	50.05	34.46	53.26	74.00	20.74	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp factor.
 2. The emission levels that are 20dB below the official limit are not reported.



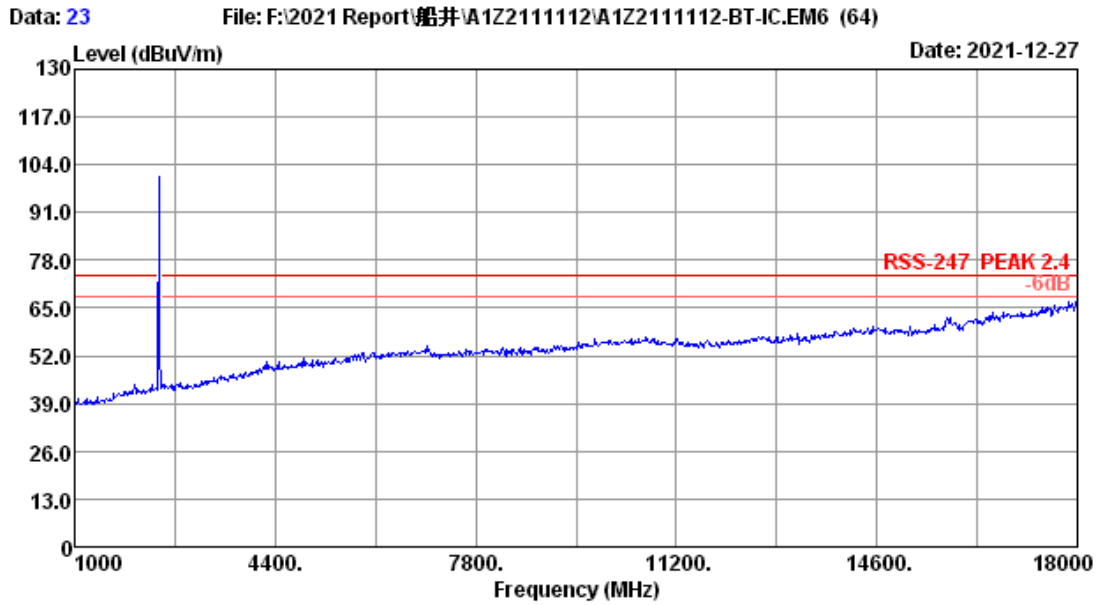
Site no.	: 3m Chamber	Data no.	: 19
Dis. / Ant.	: 3m 2021 MCTD1209-3006	Ant. pol.	: VERTICAL
Limit	: RSS-247 PEAK 2.4		
Env. / Ins.	: 22.1°C/51.5%	Engineer	: Lynn
Test Mode	: BT3.0 8DPSK 2402MHz Tx		



Site no. : 3m Chamber Data no. : 20
 Dis. / Ant. : 3m 2021 MCTD1209-3006 Ant. pol. : VERTICAL
 Limit : RSS-247 PEAK 2.4
 Env. / Ins. : 22.1°C/51.5% Engineer : Lynn
 Test Mode : BT3.0 8DPSK 2402MHz Tx

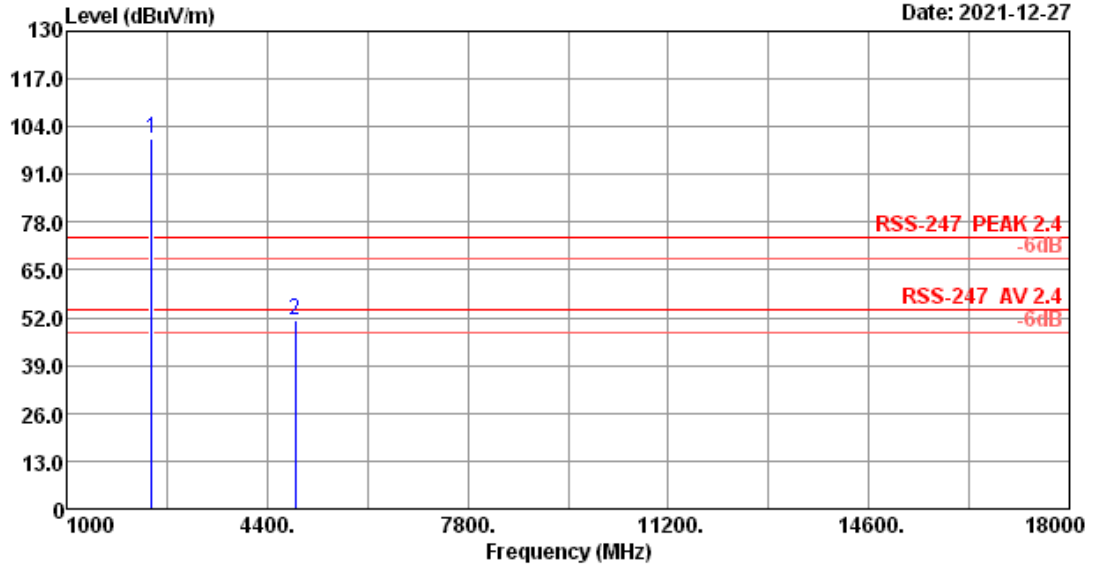
No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2402.00	27.89	3.66	99.59	35.24	95.90	-----	-----	Peak
2	4804.00	32.69	4.98	46.20	34.46	49.41	74.00	24.59	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp factor.
 2. The emission levels that are 20dB below the official limit are not reported.



Site no.	: 3m Chamber	Data no.	: 23
Dis. / Ant.	: 3m 2021 MCTD1209-3006	Ant. pol.	: HORIZONTAL
Limit	: RSS-247 PEAK 2.4		
Env. / Ins.	: 22.1°C/51.5%	Engineer	: Lynn
Test Mode	: BT3.0 8DPSK 2441MHz Tx		

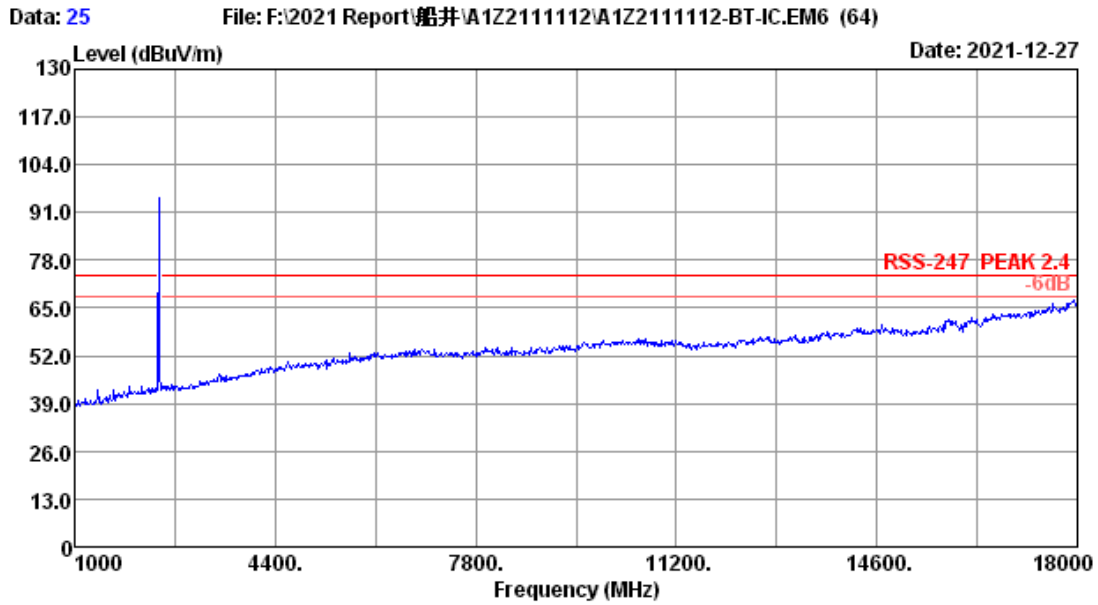
Data: 24 File: F:\2021 Report\船井\A1Z2111112\A1Z2111112-BT-IC.EM6 (64) Date: 2021-12-27



Site no. : 3m Chamber Data no. : 24
 Dis. / Ant. : 3m 2021 MCTD1209-3006 Ant. pol. : HORIZONTAL
 Limit : RSS-247 PEAK 2.4
 Env. / Ins. : 22.1°C/51.5% Engineer : Lynn
 Test Mode : BT3.0 8DPSK 2441MHz Tx

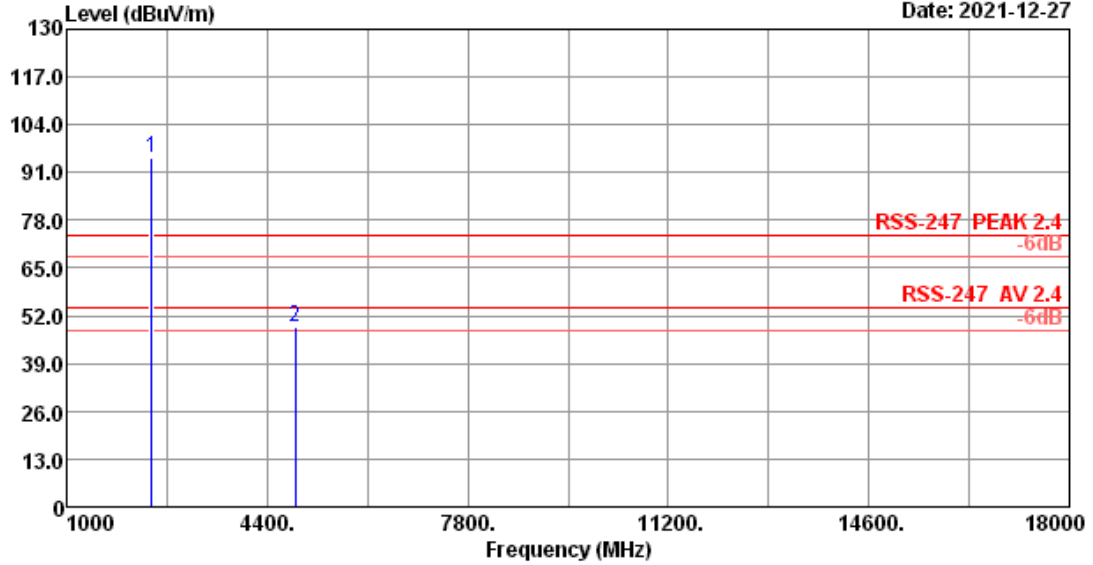
No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2441.00	28.00	3.68	104.35	35.25	100.78	74.00	26.78	Peak
2	4882.00	32.73	5.01	48.24	34.47	51.51	51.51	0.00	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp factor.
 2. The emission levels that are 20dB below the official limit are not reported.



Site no.	: 3m Chamber	Data no.	: 25
Dis. / Ant.	: 3m 2021 MCTD1209-3006	Ant. pol.	: VERTICAL
Limit	: RSS-247 PEAK 2.4		
Env. / Ins.	: 22.1°C/51.5%	Engineer	: Lynn
Test Mode	: BT3.0 8DPSK 2441MHz Tx		

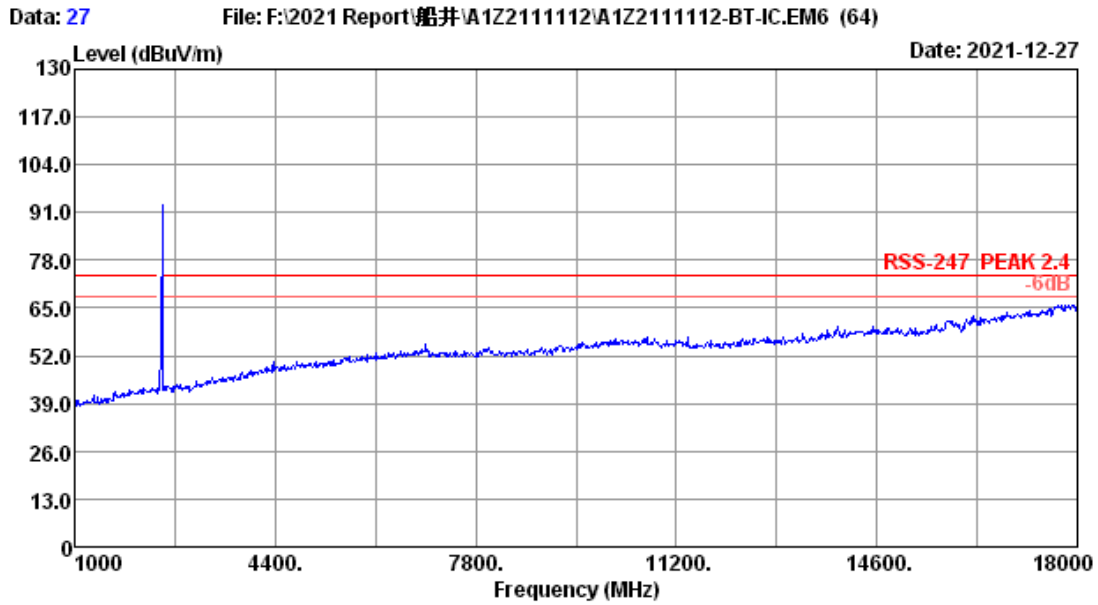
Data: 26 File: F:\2021 Report\船井\A1Z2111112\A1Z2111112-BT-IC.EM6 (64) Date: 2021-12-27



Site no. : 3m Chamber Data no. : 26
 Dis. / Ant. : 3m 2021 MCTD1209-3006 Ant. pol. : VERTICAL
 Limit : RSS-247 PEAK 2.4
 Env. / Ins. : 22.1°C/51.5% Engineer : Lynn
 Test Mode : BT3.0 8DPSK 2441MHz Tx

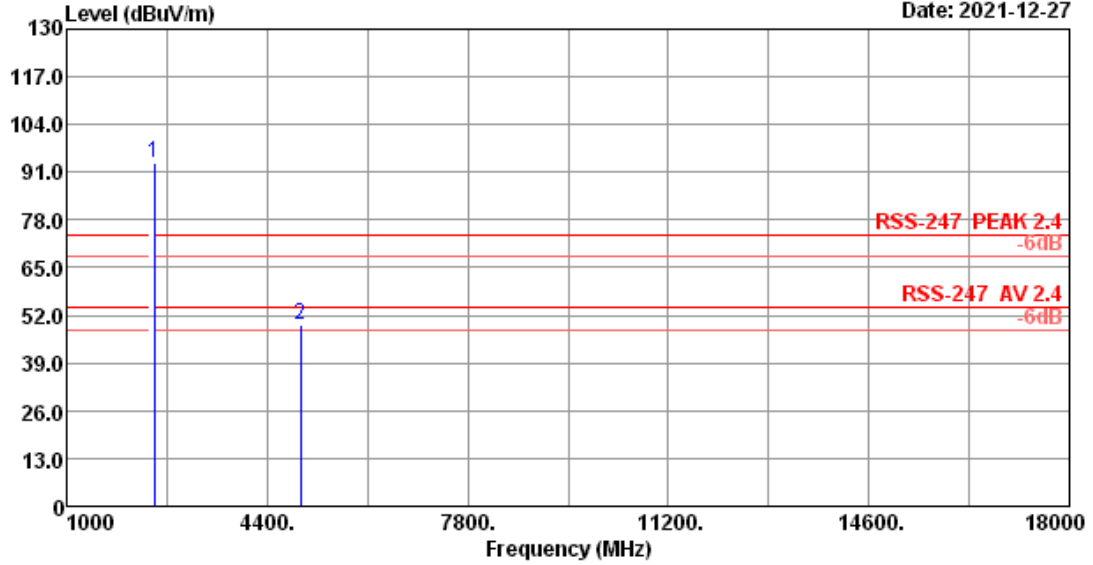
No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2441.00	28.00	3.68	98.57	35.25	95.00	-----	-----	Peak
2	4882.00	32.73	5.01	45.59	34.47	48.86	74.00	25.14	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp factor.
 2. The emission levels that are 20dB below the official limit are not reported.



Site no.	: 3m Chamber	Data no.	: 27
Dis. / Ant.	: 3m 2021 MCTD1209-3006	Ant. pol.	: VERTICAL
Limit	: RSS-247 PEAK 2.4		
Env. / Ins.	: 22.1°C/51.5%	Engineer	: Lynn
Test Mode	: BT3.0 8DPSK 2480MHz Tx		

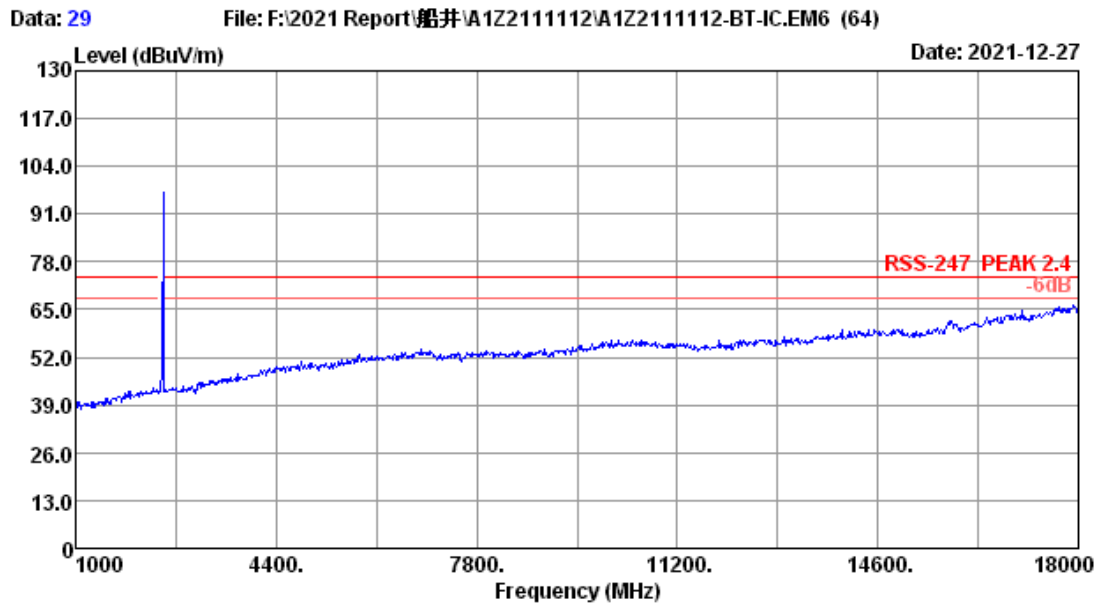
Data: 28 File: F:\2021 Report\船井\A1Z2111112\A1Z2111112-BT-IC.EM6 (64) Date: 2021-12-27



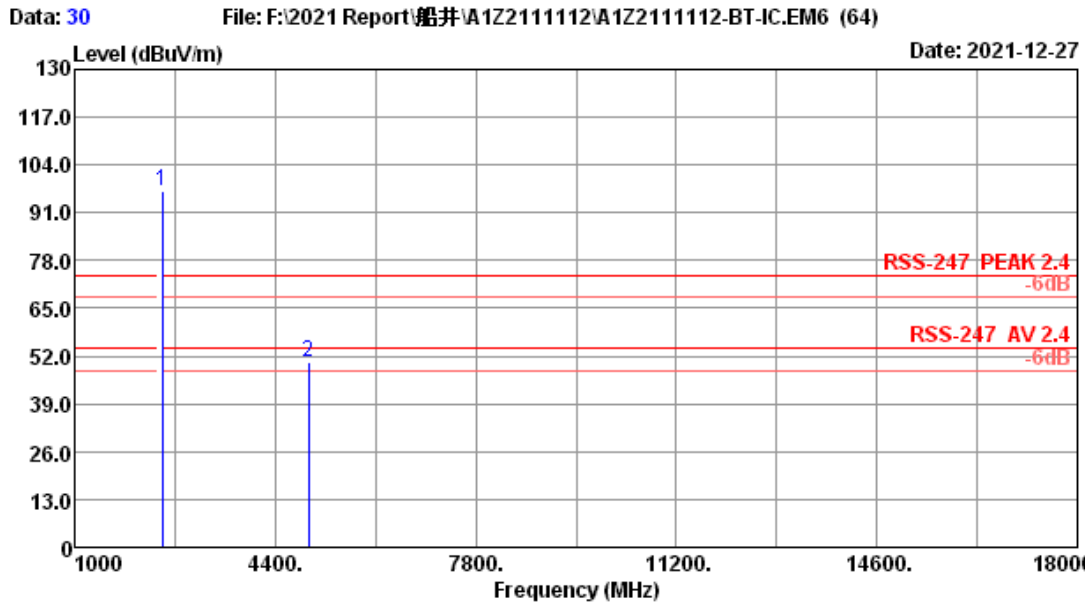
Site no. : 3m Chamber Data no. : 28
 Dis. / Ant. : 3m 2021 MCTD1209-3006 Ant. pol. : VERTICAL
 Limit : RSS-247 PEAK 2.4
 Env. / Ins. : 22.1°C/51.5% Engineer : Lynn
 Test Mode : BT3.0 8DPSK 2480MHz Tx

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2480.00	28.07	3.71	96.89	35.25	93.42	74.00	24.75	Peak
2	4960.00	32.78	5.03	45.93	34.49	49.25	49.25	0.00	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp factor.
 2. The emission levels that are 20dB below the official limit are not reported.



Site no.	: 3m Chamber	Data no.	: 29
Dis. / Ant.	: 3m 2021 MCTD1209-3006	Ant. pol.	: HORIZONTAL
Limit	: RSS-247 PEAK 2.4		
Env. / Ins.	: 22.1°C/51.5%	Engineer	: Lynn
Test Mode	: BT3.0 8DPSK 2480MHz Tx		



Site no. : 3m Chamber Data no. : 30
 Dis. / Ant. : 3m 2021 MCTD1209-3006 Ant. pol. : HORIZONTAL
 Limit : RSS-247 PEAK 2.4
 Env. / Ins. : 22.1°C/51.5% Engineer : Lynn
 Test Mode : BT3.0 8DPSK 2480MHz Tx

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2480.00	28.07	3.71	100.41	35.25	96.94	-----	-----	Peak
2	4960.00	32.78	5.03	46.88	34.49	50.20	74.00	23.80	Peak

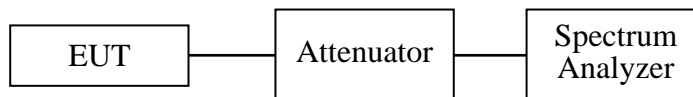
Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp factor.
 2. The emission levels that are 20dB below the official limit are not reported.

5. CONDUCTED SPURIOUS EMISSIONS

5.1. Test Equipments

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	PXA Signal Analyzer	Agilent	N9030A	MY51380221	Apr.07,21	1 Year
2.	RF Cable	HUBER+SUHNER	SUCOFLEX-106	505238/6	Apr.07,21	1 Year

5.2. Block Diagram of Test Setup



5.3. Limit

In any 100kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power.

5.4. Test Procedure

Use the test method described in ANSI C63.10 clause 7.8.8:

The transmitter output was connected to a spectrum analyzer, The resolution bandwidth is set to 100 kHz, The video bandwidth is set to 300 kHz and measure all the emissions With peak detector.

Note: The cable loss and attenuator loss were offset into spectrum analyzer as an amplitude offset.

5.5. Test result

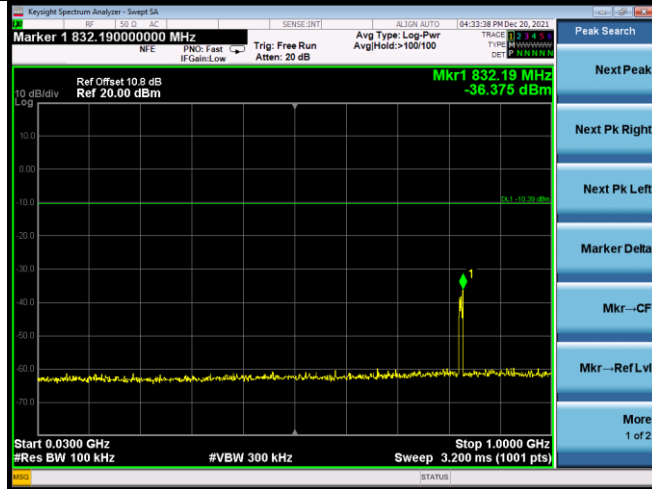
PASS (The testing data was attached in the next pages.)

EUT: WiFi module		
M/N: U9W43		
Test date: 2021-12-20	Pressure: 102.1±1.0 kpa	Humidity: 52.1±3.0%
Tested by: Winter	Test site: RF site	Temperature: 21.8±0.6 °C

Hopping off

GFSK

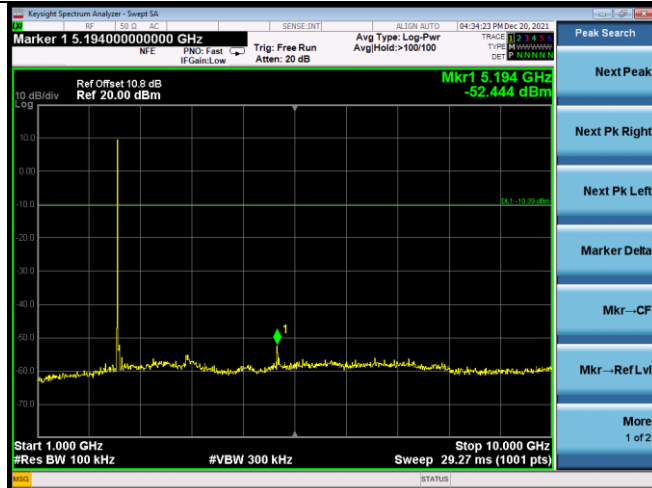
2402MHz(30MHz – 1GHz)



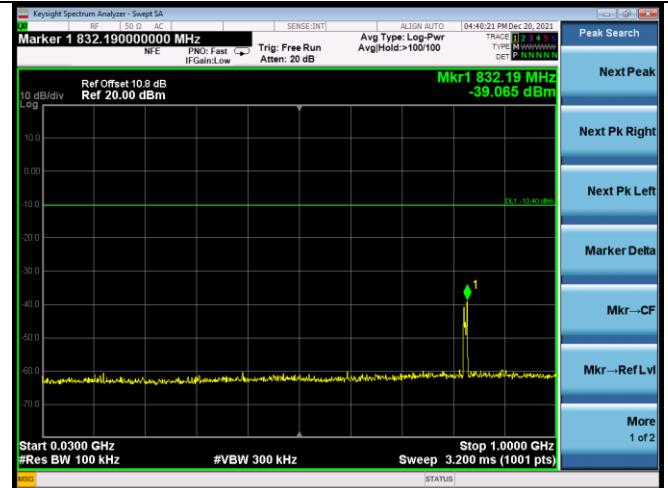
2402MHz(10GHz – 26GHz)



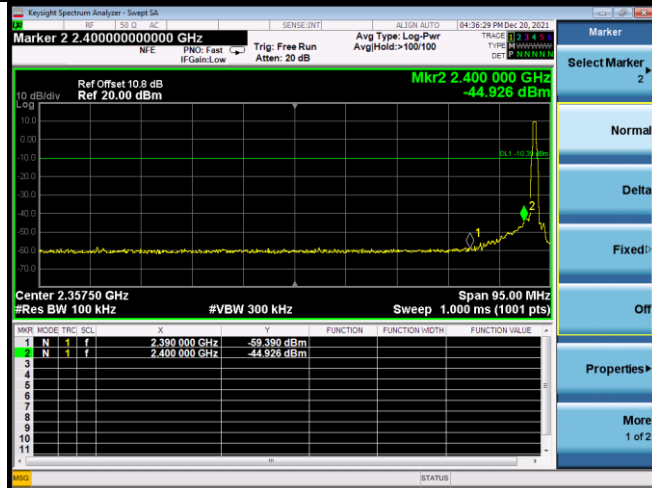
2402MHz(1GHz – 10GHz)



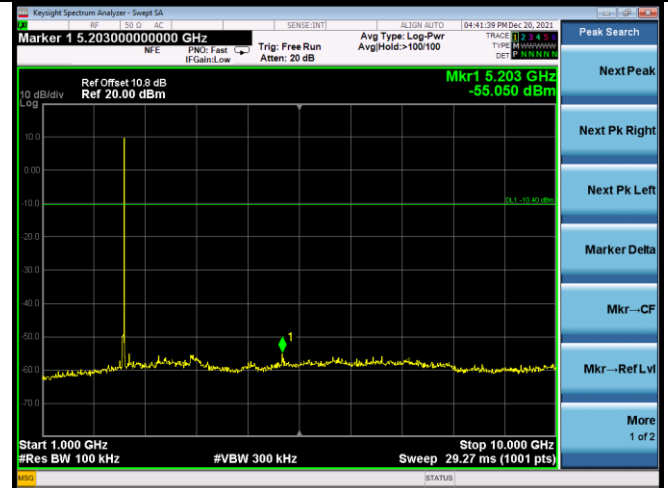
2441(30MHz – 1GHz)



2402MHz(2.3GHz – 2.4GHz)



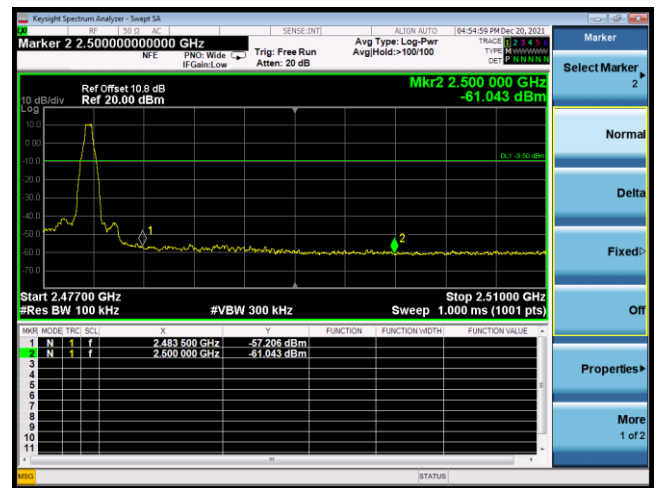
2441(1GHz – 10GHz)



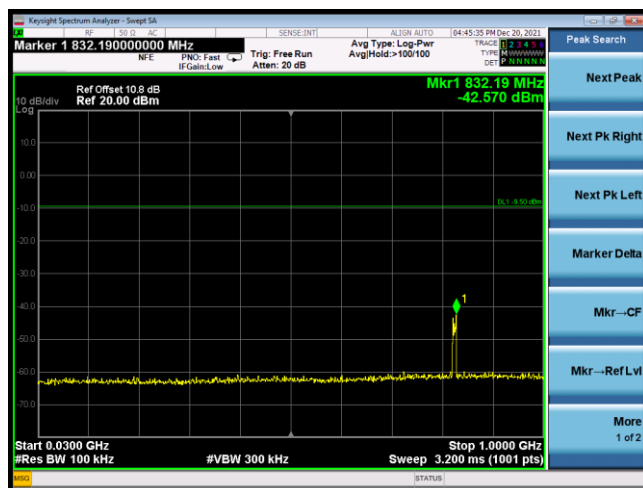
2441(10GHz – 26GHz)



2480MHz(2.4GHz – 2.5GHz)



2480MHz(30MHz – 1GHz)

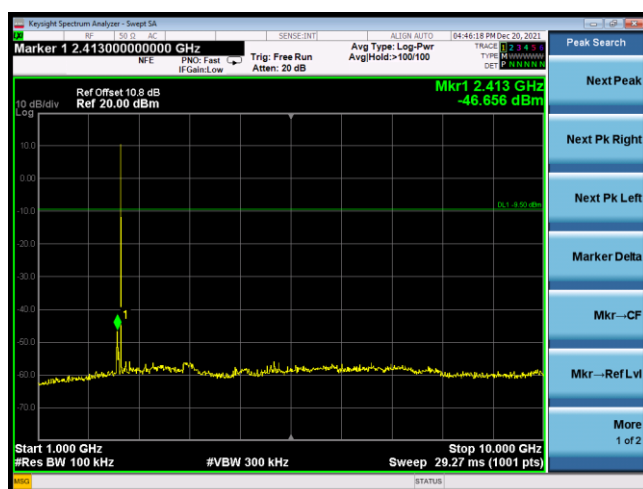


2480MHz(10GHz – 26GHz)

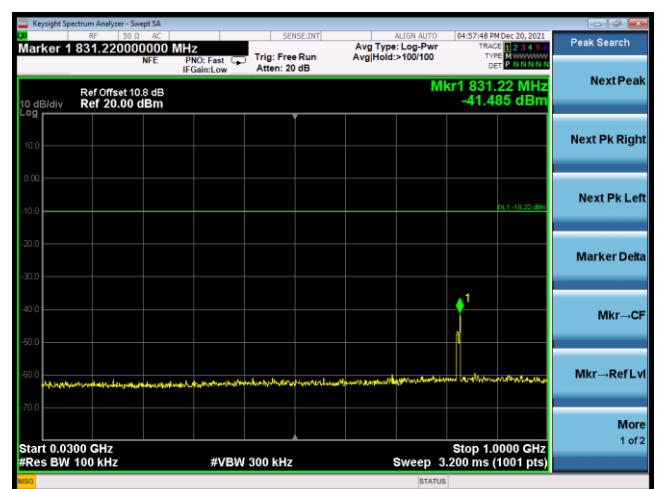


8-DPSK

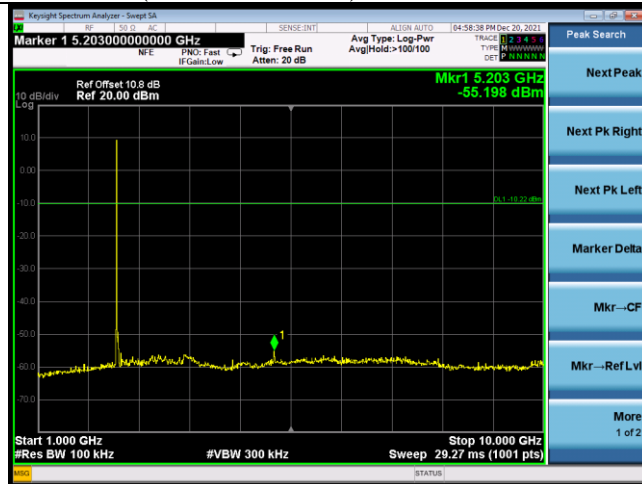
2480MHz(1GHz – 10GHz)



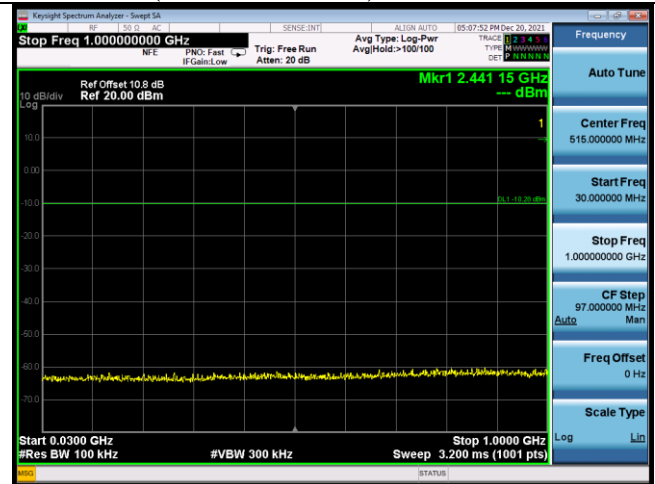
2402MHz(30MHz – 1GHz)



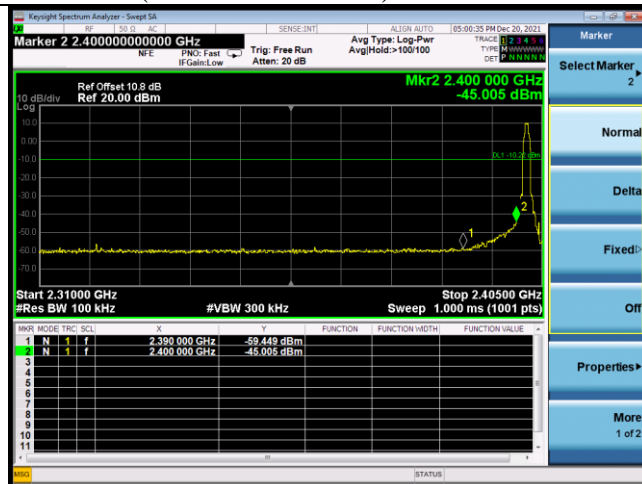
2402MHz(1GHz – 10GHz)



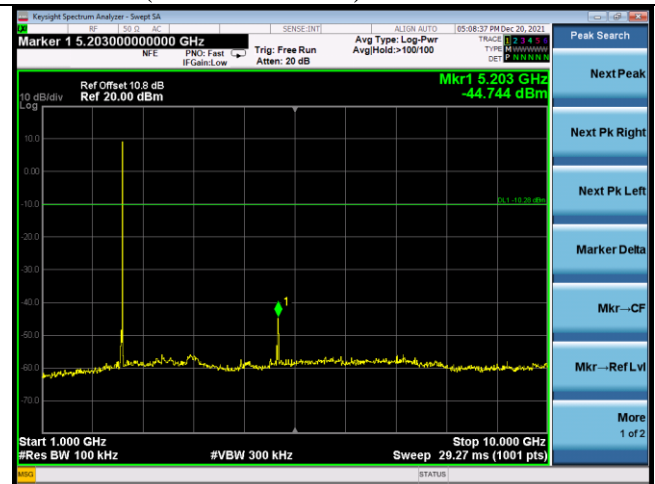
2441MHz(30MHz – 1GHz)



2402MHz(2.3GHz – 2.4GHz)



2441MHz(1GHz – 10GHz)



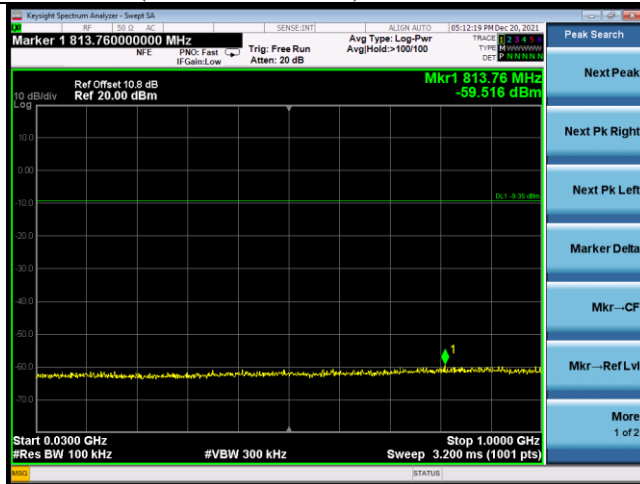
2402MHz(10GHz – 26GHz)



2441MHz(10GHz – 26GHz)



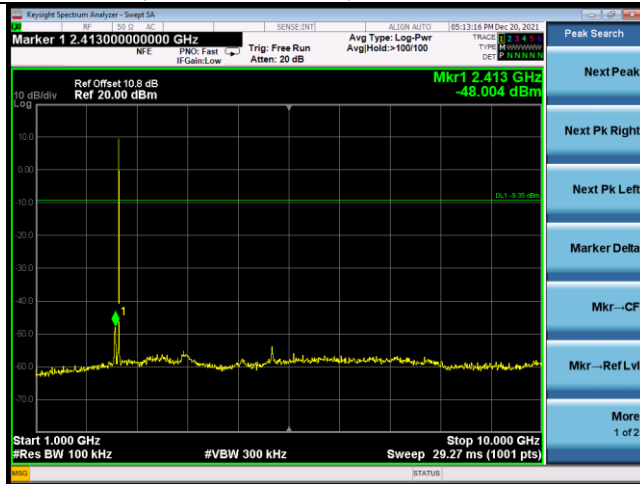
2480MHz(30MHz – 1GHz)



2480MHz(10GHz – 26GHz)

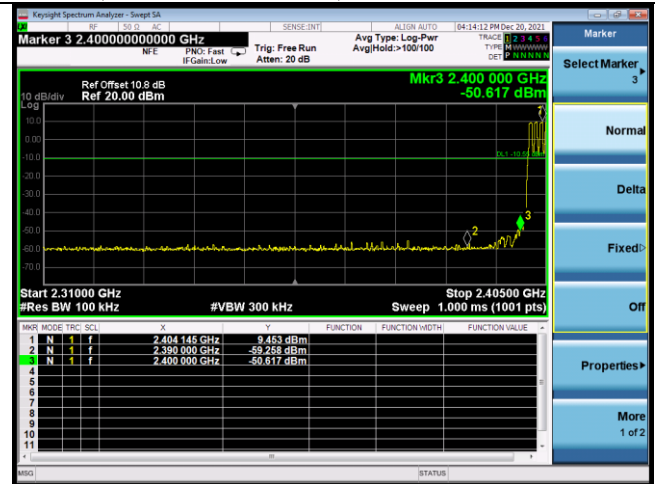


2480MHz(1GHz – 10GHz)

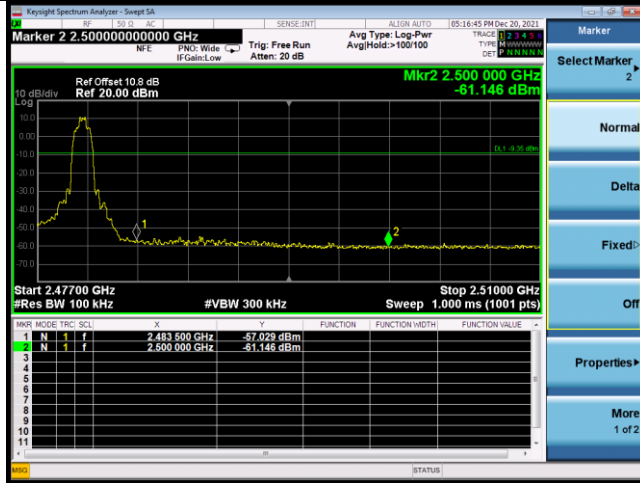


Hopping on

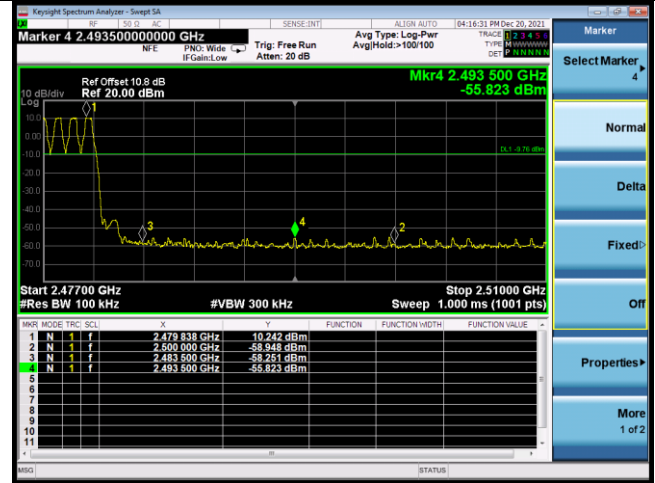
GFSK(2.3GHz – 2.4GHz)

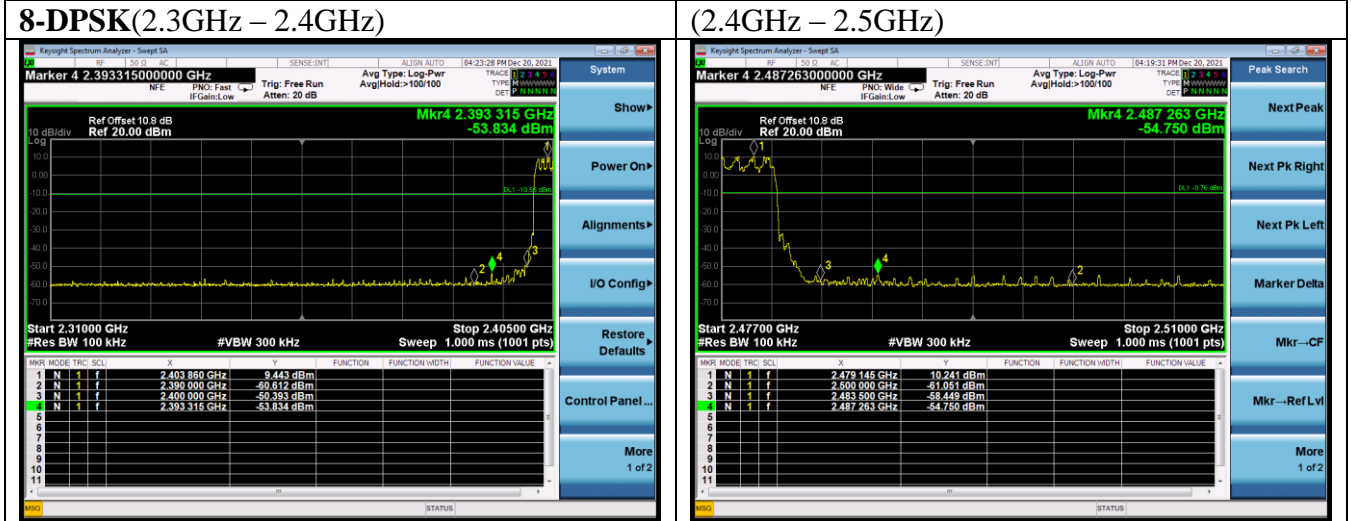


2480MHz(2.4GHz – 2.5GHz)



(2.4GHz – 2.5GHz)





6. 20 DB & 99% BANDWIDTH TEST

6.1. Test Equipments

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	PXA Signal Analyzer	Agilent	N9030A	MY51380221	Apr.07,21	1 Year
2.	RF Cable	HUBER+SUHNER	SUCOFLE X-106	505238/6	Apr.07,21	1 Year

6.2. Limit

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in RSS-GEN, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

6.3. Test Procedure

Use the test method described in ANSI C63.10 clause 7.8.7:

1. Connect the antenna port of the EUT to the spectrum analyzer.
2. Let the EUT transmit at Low/ Mid/ High channel with test software.
3. Setting of SA is following as: RBW: 30kHz / VBW: 100kHz
Sweep Mode: Continuous sweep
Detect mode: Positive peak
Trace mode: Max hold.
4. Use the occupied bandwidth function of the SA measure the 20dB bandwidth directly.

6.4. Test Results

EUT: WiFi module		
M/N: U9W43		
Test date: 2021-12-20	Pressure: 102.1±1.0 kpa	Humidity: 52.1±3.0%
Tested by: Winter	Test site: RF site	Temperature:21.8±0.6 °C

Test Mode	Frequency (MHz)	20dB bandwidth (KHz)	Limit (KHz)
GFSK	2402	853.1	N/A
	2441	851.0	N/A
	2480	852.4	N/A
8-DPSK	2402	1265	N/A
	2441	1266	N/A
	2480	1266	N/A

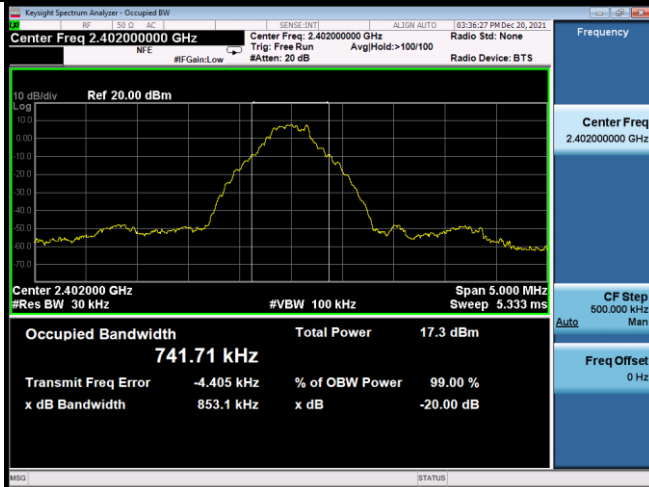
Conclusion : PASS

Test Mode	Frequency (MHz)	99% Bandwidth (KHz)	Limit (KHz)
GFSK	2402	741.71	N/A
	2441	741.80	N/A
	2480	741.13	N/A
8-DPSK	2402	1146.2	N/A
	2441	1146.2	N/A
	2480	1146.8	N/A

Conclusion : PASS

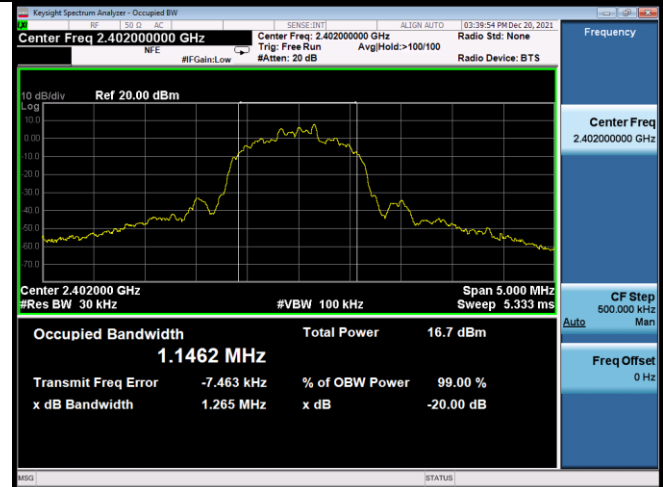
GFSK

2402MHz

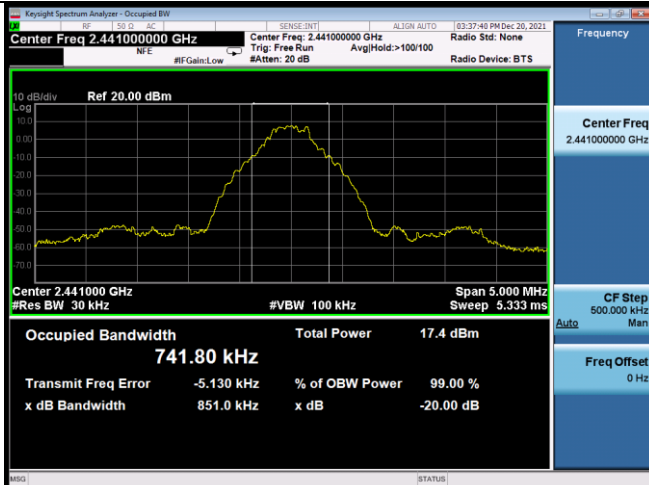


8-DPSK

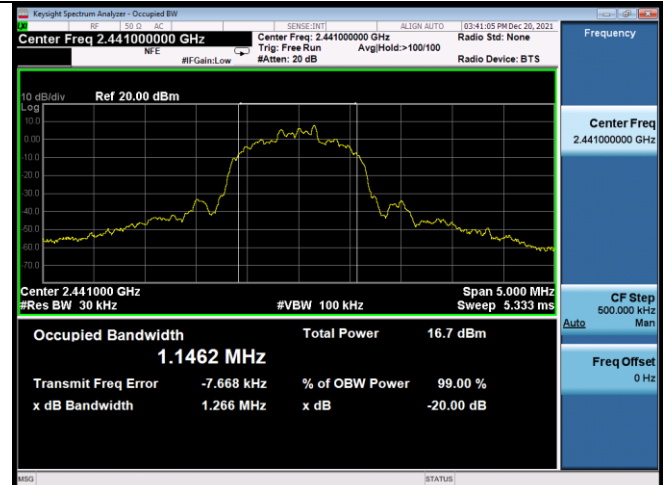
2402MHz



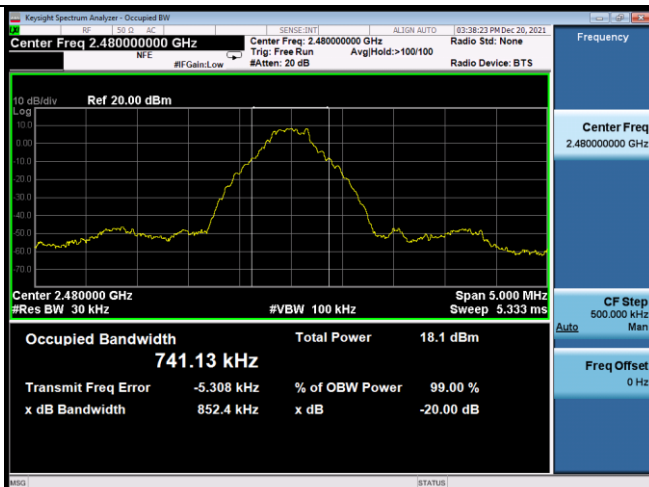
2441MHz



2441MHz



2480MHz



2480MHz



7. CARRIER FREQUENCY SEPARATION TEST

7.1. Test Equipments

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	PXA Signal Analyzer	Agilent	N9030A	MY51380221	Apr.07,21	1 Year
2.	RF Cable	HUBER+SUHNER	SUCOFLEX-106	505238/6	Apr.07,21	1 Year

7.2. Limit

Frequency hopping systems shall have hopping channel carrier frequency separated by a minimum of 25kHz or the 20dB bandwidth of the hopping channel, whichever is greater. 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.

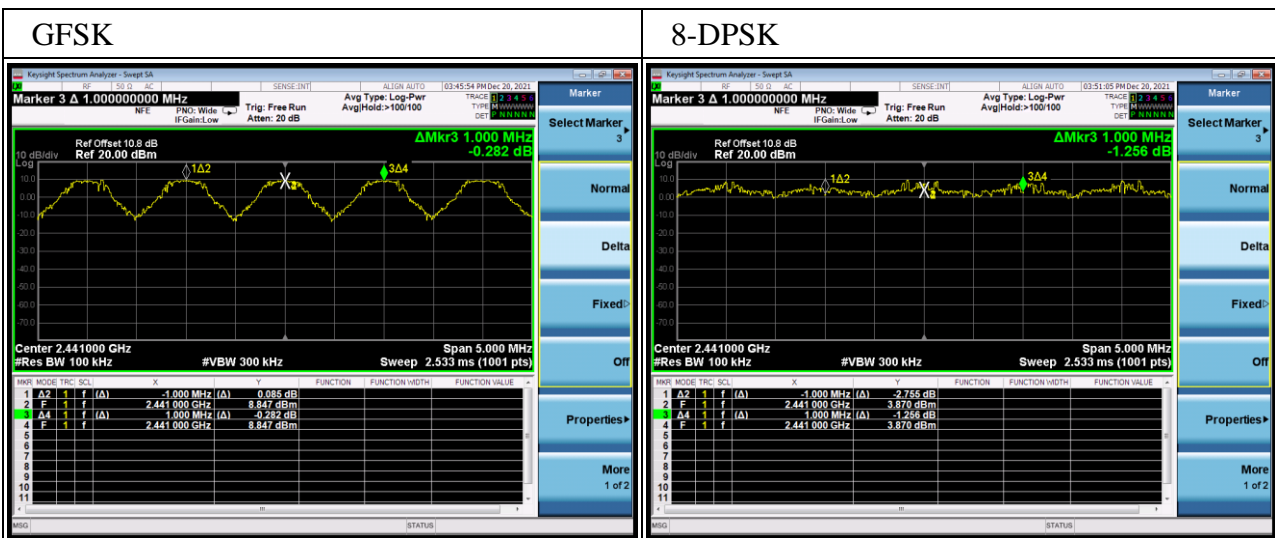
7.3. Test Procedure

Use the test method described in ANSI C63.10 clause 7.8.2:

1. Connect the antenna port of the EUT to the Spectrum analyzer.
2. Let the EUT transmit at Low/ Mid/ High channel.
3. Setting of SA is following as: RBW: 100kHz / VBW: 300kHz.Span: 3MHz
4. Use the mark Delta function of the SA measure out the channel separation.

7.4. Test Results.

EUT: WiFi module			
M/N: U9W43			
Test date: 2021-12-20		Pressure: 102.1 ±1.0 kpa	Humidity: 51.1 ±3.0%
Tested by: Winter		Test site: RF site	Temperature: 22.8 ±0.6 °C
Test Mode	Channel separation	Limit(kHz)	Conclusion
GFSK	1.0MHz	568.733	PASS
8-DPSK	1.0MHz	844.000	PASS



8. NUMBER OF HOPPING FREQUENCY TEST

8.1. Test Equipments

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	PXA Signal Analyzer	Agilent	N9030A	MY51380221	Apr.07,21	1 Year
2.	RF Cable	HUBER+SUHNER	SUCOFLEX-106	505238/6	Apr.07,21	1 Year

8.2. Limit

Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels

8.3. Test Procedure

Use the test method described in ANSI C63.10 clause 7.8.3:

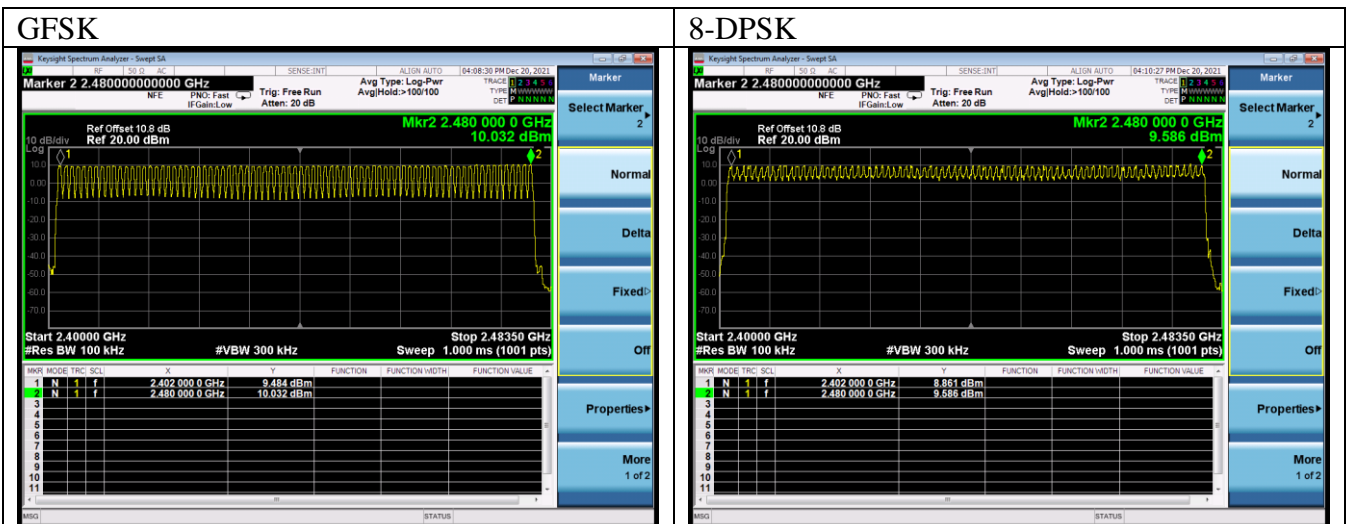
1. Connect the antenna of the EUT to Spectrum analyzer and let the EUT working at hopping mode.
2. Setting of SA is following as: RBW: 100kHz / VBW: 300kHz ,
Start frequency: 2390MHz
Stop frequency: 2483.5MHz

And waiting for the hopping trace until stability, count out the number of the hopping.

8.4. Test Results

EUT: WiFi module		
M/N: U9W43		
Test date: 2021-12-20	Pressure: 102.1 ±1.0 kpa	Humidity: 51.1 ±3.0%
Tested by: Winter	Test site: RF site	Temperature: 22.8 ±0.6 °C

Test Mode	Number of channel	Limit	Conclusion
GFSK	79	≥15	PASS
8-DPSK	79	≥15	PASS



9. DWELL TIME

9.1. Test Equipments

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	PXA Signal Analyzer	Agilent	N9030A	MY51380221	Apr.07,21	1 Year
2.	RF Cable	HUBER+SUHNER	SUCOFLEX-106	505238/6	Apr.07,21	1 Year

9.2. Limit

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

9.3. Test Procedure

Use the test method described in ANSI C63.10 clause 7.8.4:

1. Connect the antenna of the EUT to Spectrum analyzer and let the EUT working at hopping mode.
2. Setting of SA is following as:
 RBW: 100kHz / VBW: 100kHz
 Sweep Mode: Single
 Detect mode: Positive peak
 Trace mode: Auto
 Span: 0Hz
 Sweep time: 5s and big enough to measure one hopping signal
3. Use below formula calculate the Dwell time
 Dwell time=Hopping number per second*0.4*channel number*Pulse bandwidth per hopping.

9.4. Test Results

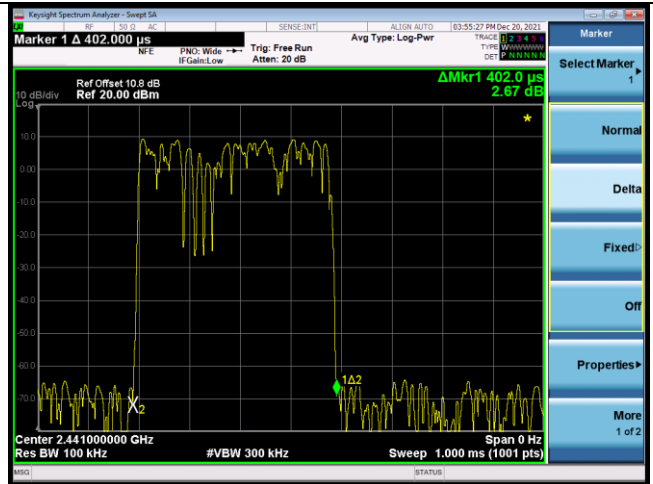
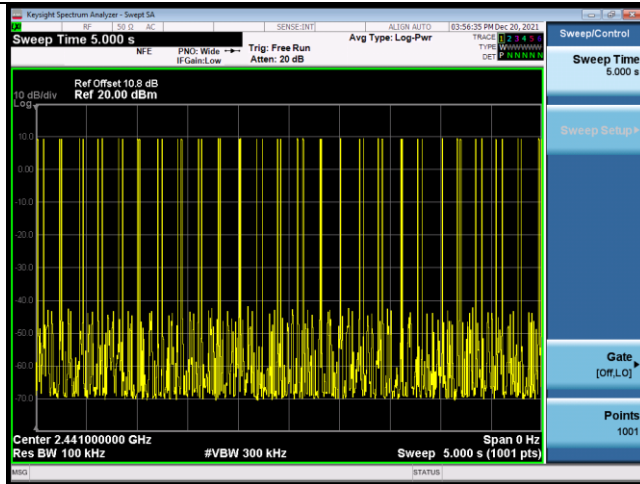
EUT: WiFi module		
M/N: U9W43		
Test date: 2021-12-20	Pressure: 102.1 ±1.0 kpa	Humidity: 51.1 ±3.0%
Tested by: Winter	Test site: RF site	Temperature: 22.8 ±0.6 °C

Mode	dwell time		Limit	Conclusion
GFSK	DH1	45 hops/5s*0.4s*79channels* 0.402 ms =114.329ms	≤ 400ms	PASS
	DH3	26 hops/5s*0.4s*79channels* 1.659 ms =272.607ms	≤ 400ms	PASS
	DH5	21 hops/5s*0.4s*79channels* 2.930 ms =388.870ms	≤ 400ms	PASS
8-DPSK	3-DH1	46 hops/5s*0.4s*79channels* 0.411 ms =119.486ms	≤ 400ms	PASS
	3-DH3	25 hops/5s*0.4s*79channels* 1.677 ms =264.966ms	≤ 400ms	PASS
	3-DH5	20 hops/5s*0.4s*79channels* 2.940 ms =371.616ms	≤ 400ms	PASS

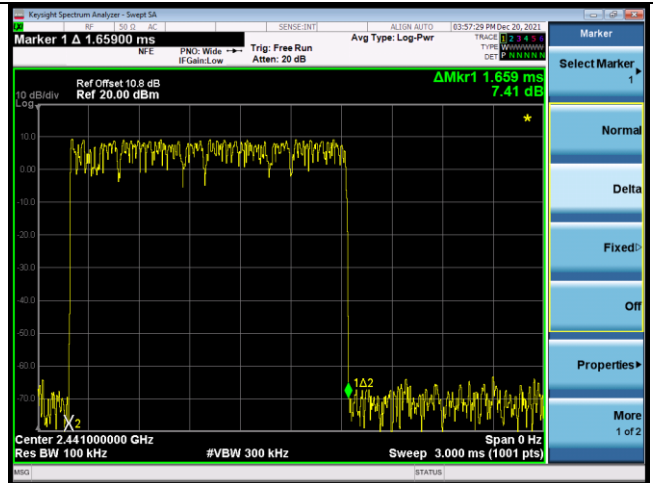
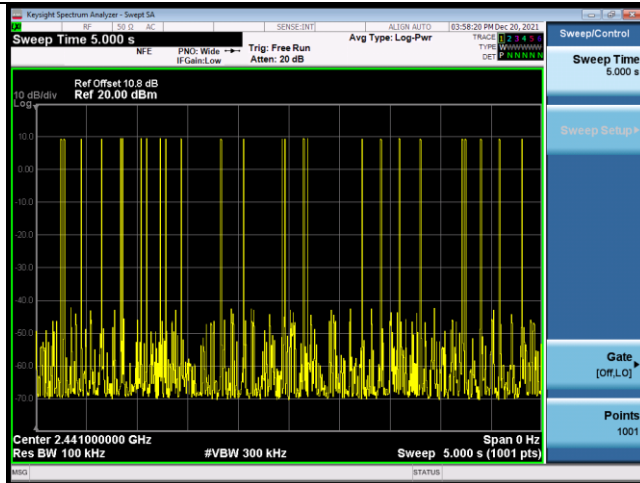
Note: All the lower levels were signaled from receiver and should not be considered in here.

GFSK

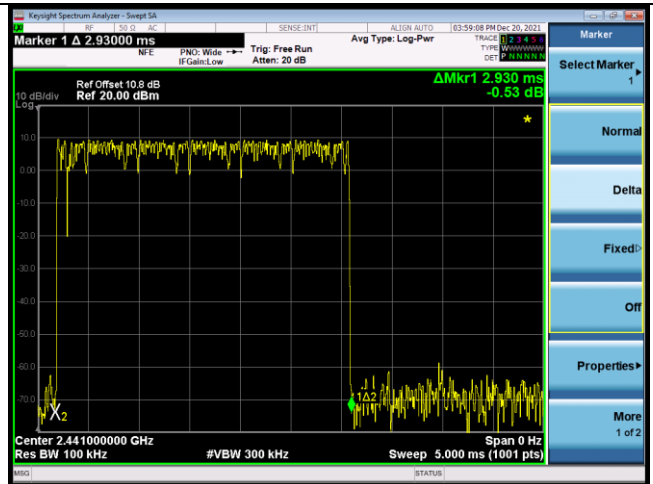
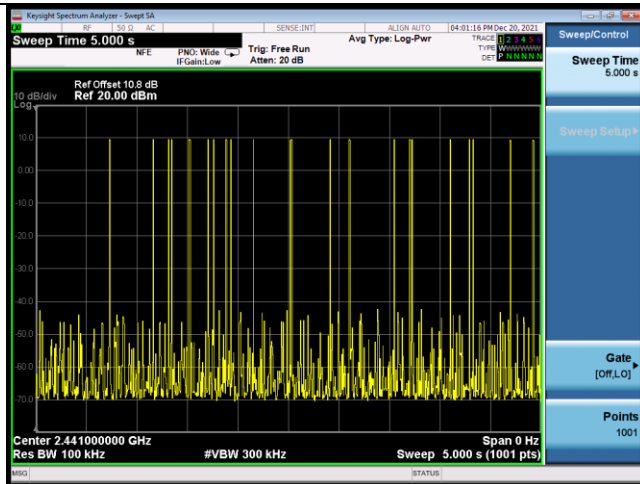
DH 1



DH 3

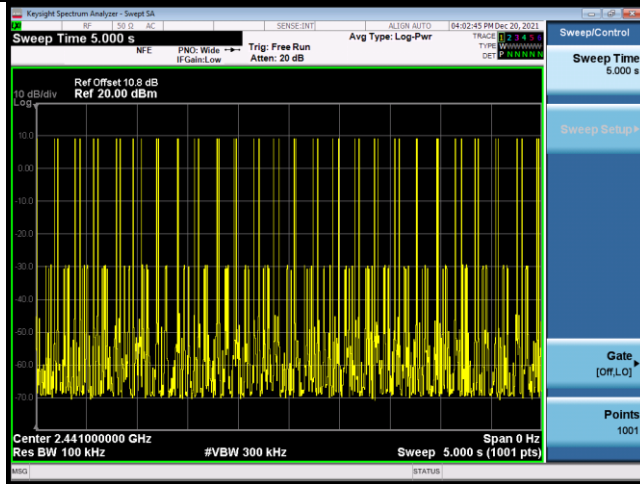


DH 5

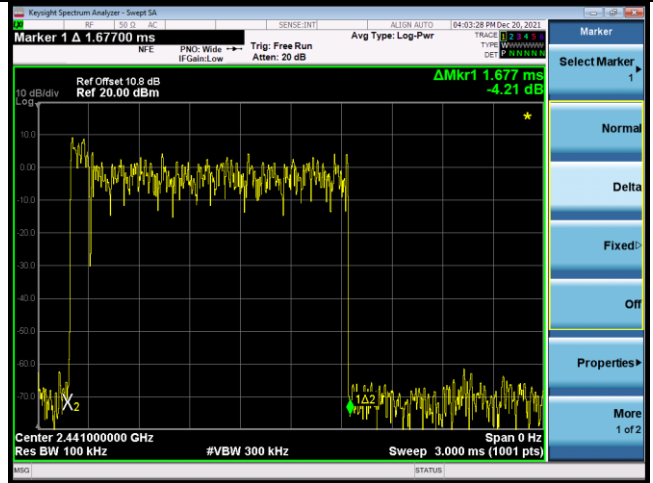
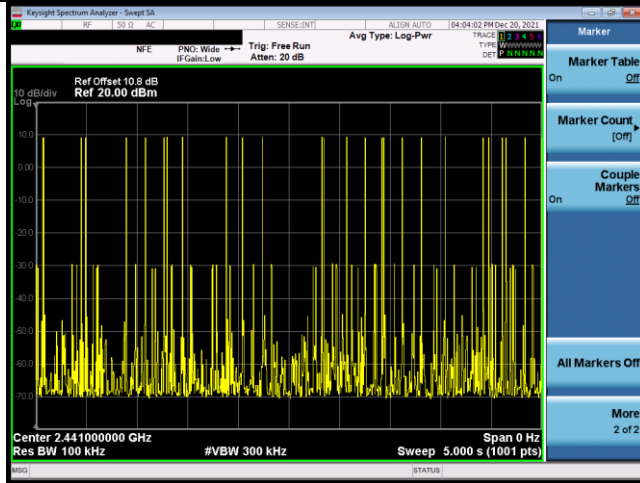


8-DPSK

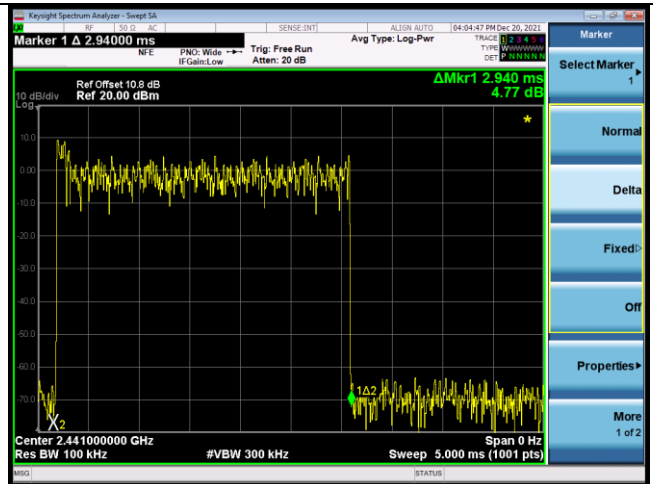
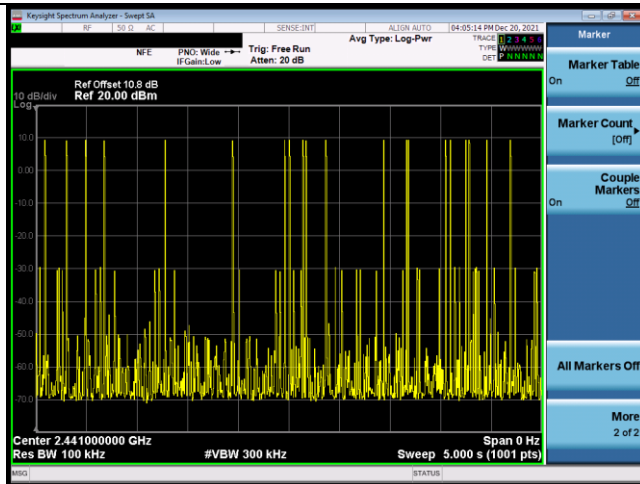
3DH 1



3DH 3



3DH 5



10. MAXIMUM PEAK OUTPUT POWER TEST

10.1. Test Equipments

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	PXA Signal Analyzer	Agilent	N9030A	MY51380221	Apr.07,21	1 Year
2.	Power meter	Anritsu	ML2487A	6K00002472	Apr.07,21	1 Year
3.	Power sensor	Anritsu	MA2491A	033005	Apr.06,21	1 Year
4.	RF Cable	HUBER+SUHNER	SUCOFLE X-106	505238/6	Apr.07,21	1 Year

10.2. Limit

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, the max. peak conducted output power should not exceed 1.0W and the E.I.R.P shall not exceed 4W.

10.3. Test Procedure

Use the test method described in ANSI C63.10 clause 7.8.5:

Connected the EUT's antenna port to Power Sensor, and use power meter to test peak output power directly. Then add the antenna Gain get the EIRP test result.

10.4. Test Results

EUT: WiFi module		
M/N: U9W43		
Test date: 2021-12-11	Pressure: 101.3±1.0 kpa	Humidity: 52.6±3.0%
Tested by: Winter	Test site: RF site	Temperature: 21.5±0.6°C

Test Mode	Frequency	Peak output Power (dBm)	Limit (dBm)
GFSK	2402	10.143	30
	2441	10.251	30
	2480	11.018	30
8-DPSK	2402	10.167	30
	2441	10.296	30
	2480	10.959	30
Conclusion: PASS			

11.EQUIVALENT ISOTROPIC RADIATED POWER TEST

11.1.Limit

Limit
36dBm / (4W) (e.i.r.p)

These limits shall apply for any combination of power level and intended antenna assembly.

11.2.Test Method

Use the test method described in ANSI C63.10 Annex G:

(1) Connected the EUT's antenna port to the Spectrum Analyzer by suitable attenuator , set the Spectrum Analyzer as below:

Span: Zero

RBW: 100kHz

VBW: 100kHz

Read out the duty cycle(X) of the transmitter and record as X

(2)Use a power meter measure the average power of the EUT.

(3)Calculated e.i.r.p according to the formula: Read + Cable loss + Atten loss + Antenna Gain + 10log(1/x)

(4)Repeated test at the lowest, the middle, and the highest frequency of the stated frequency range.

11.3.Test Results

EUT: WiFi module		
M/N: U9W43		
Test date: 2020-12-15	Pressure: 101.3±1.0 kpa	Humidity: 52.6±3.0%
Tested by: Winter	Test site: RF site	Temperature: 21.5±0.6°C

Test Mode	Frequency (MHz)	EIRP (dBm)	Limit (dBm)
GFSK	2402	9.723	36
	2441	9.831	36
	2480	10.598	36
8-DPSK	2402	9.747	36
	2441	9.876	36
	2480	10.539	36
Conclusion: PASS			

12. BAND EDGE COMPLIANCE TEST

12.1. Test Equipments

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	PXA Signal Analyzer	Agilent	N9030A	MY51380221	Apr.07,21	1 Year
2.	Amplifier	Agilent	8449B	3008A02495	Apr.07,21	1 Year
3.	Horn Antenna	ETC	MCTD 1209	DRH15F03006	Jul.26,21	1 Year
4.	RF Cable	HUBER+SUHNER	SUCOFLEX-106	505238/6	Apr.07,21	1 Year

12.2. Limit

All the lower and upper band-edges emissions appearing within 2310MHz to 2390MHz and 2483.5MHz to 2500MHz restricted frequency bands shall not exceed the limits shown in RSS-247, all the other emissions outside operation frequency band 2400MHz to 2483.5MHz shall be at least 20dB below the fundamental emissions, or comply with RSS-210 limits.

12.3. Test Produce

Use the test method described in ANSI C63.10 clause 7.8.6:

For upper band emissions that are up to two bandwidths(2MHz) away (2483.5MHz to 2485.5MHz) from the band-edge use below produce:

1. Choose a spectrum analyzer span that encompasses both the peak of the fundamental emission and the band-edge emission under investigation. Set the analyzer RBW to 100KHz and with a video bandwidth 300KHz. Record the peak levels of the fundamental emission and the relevant band-edge emission, Observe the stored trace and measure the amplitude delta between the peak of the fundamental and the peak of the band-edge emission. This is not a field strength measurement, it is only a relative measurement to determine the amount by which the emission drops at the band edge relative to the highest fundamental emission level.
2. Subtract the delta measured in step (1) from the maximum field strengths measured in clause 4 .The resultant field strengths are then used to determine band-edge compliance as required by Section RSS-247.

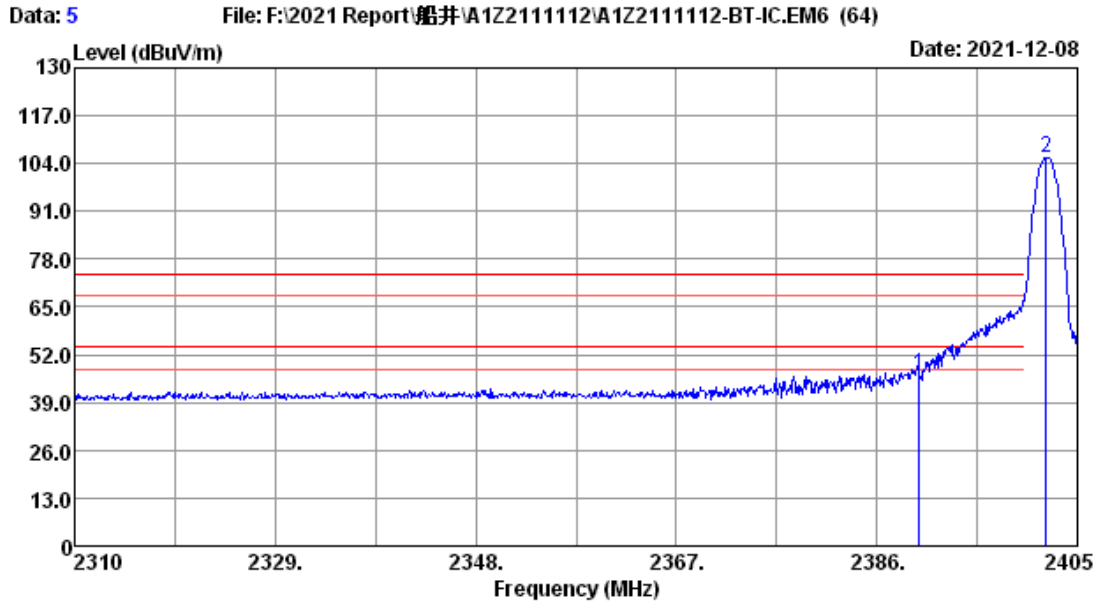
For emissions above two bandwidths away from the band-edge use below produce:

1. The EUT is placed on a insulating material (up to 12mm thick) worked at highest radiated power.
2. The turntable was rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.
4. Set the spectrum analyzer in the following setting in order to capture the lower and upperband-edges of the emission:
 - (a) PEAK: RBW=1MHz ;VBW=3MHz, PK detector, Sweep=AUTO
 - (b) This is pulse Modulation device a duty cycle factor was used to calculate average level based measured peak level.

12.4. Test Results

Pass (The testing data was attached in the next pages.)

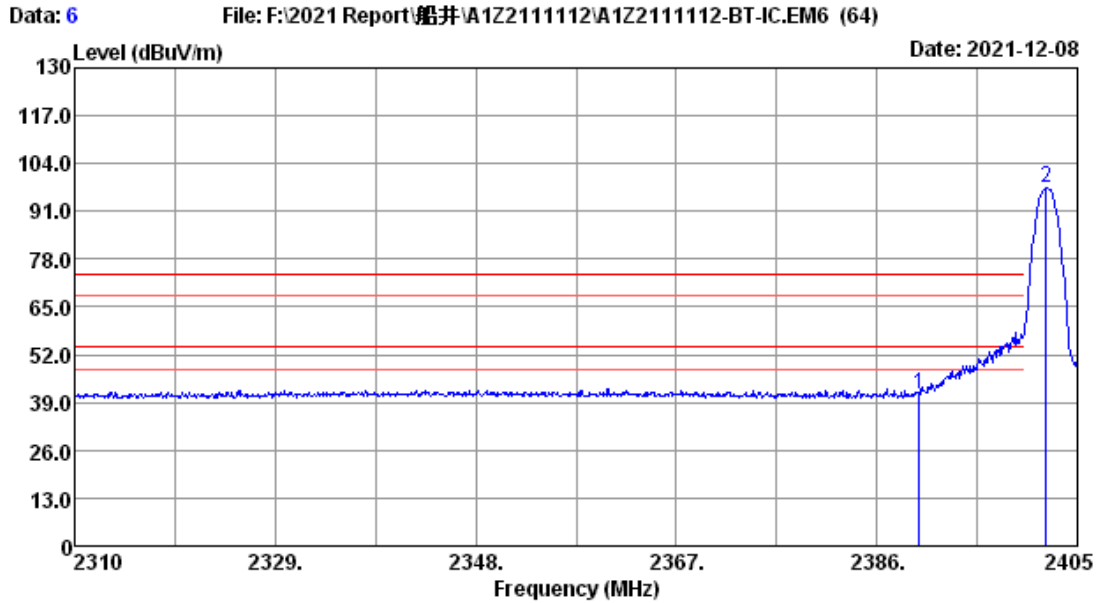
Note: If the PK measured levels comply with average limit, then the average level were deemed to comply with average limit.



Site no. : 3m Chamber Data no. : 5
 Dis. / Ant. : 3m 2021 MCTD1209-3006 Ant. pol. : HORIZONTAL
 Limit : RSS-247 PEAK 2.4
 Env. / Ins. : 22.1°C/51.5% Engineer : Lynn
 Test Mode : BT3.0 GFSK 2402MHz Tx

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2390.00	27.89	3.65	50.11	35.24	46.41	74.00	27.59	Peak
2	2402.06	27.89	3.66	109.27	35.24	105.58	-----	-----	Peak

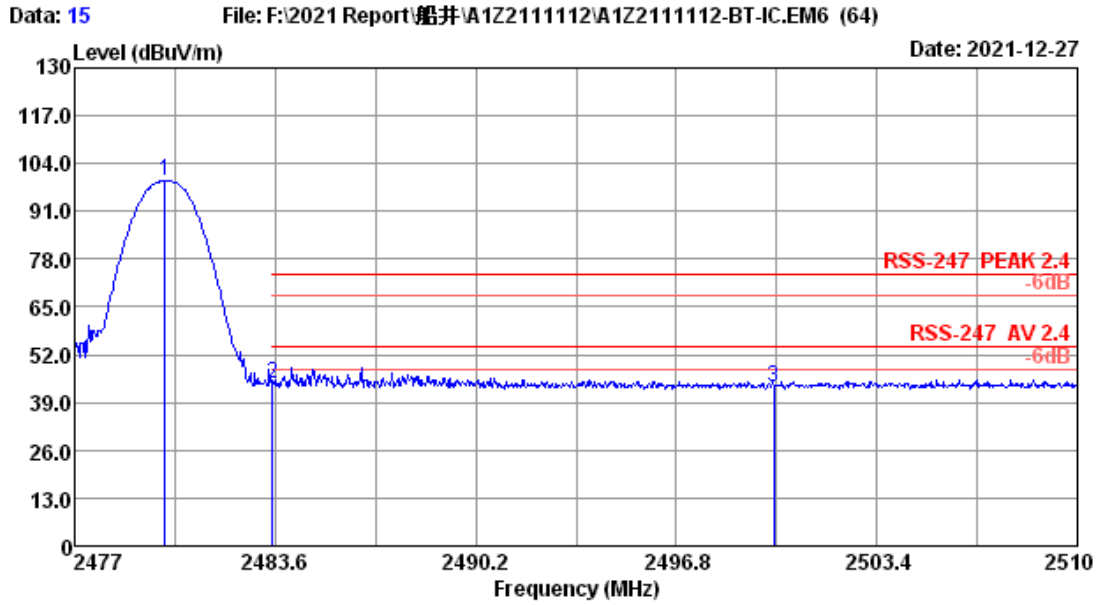
Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading - Amp factor.
 2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 3m Chamber Data no. : 6
 Dis. / Ant. : 3m 2021 MCTD1209-3006 Ant. pol. : VERTICAL
 Limit : RSS-247 PEAK 2.4
 Env. / Ins. : 22.1°C/51.5% Engineer : Lynn
 Test Mode : BT3.0 GFSK 2402MHz Tx

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2390.00	27.89	3.65	44.85	35.24	41.15	74.00	32.85	Peak
2	2402.06	27.89	3.66	101.03	35.24	97.34	-----	-----	Peak

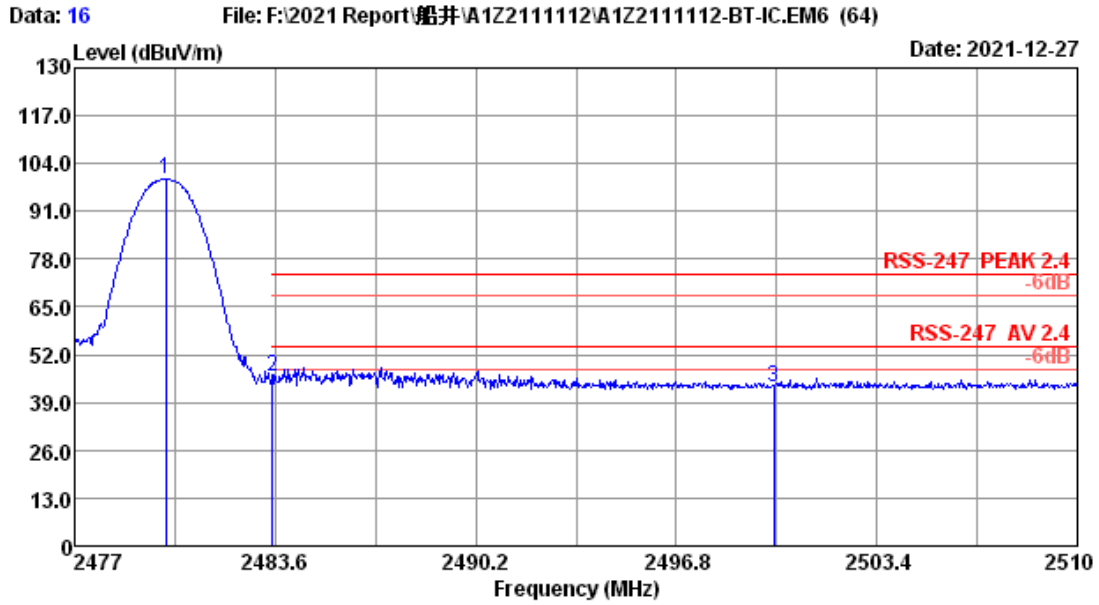
Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading - Amp factor.
 2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 3m Chamber Data no. : 15
 Dis. / Ant. : 3m 2021 MCTD1209-3006 Ant. pol. : VERTICAL
 Limit : RSS-247 PEAK 2.4
 Env. / Ins. : 22.1°C/51.5% Engineer : Lynn
 Test Mode : BT3.0 GFSK 2480MHz Tx

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2479.97	28.07	3.71	102.79	35.25	99.32	-----	-----	Peak
2	2483.50	28.07	3.71	47.41	35.25	43.94	74.00	30.06	Peak
3	2500.00	28.10	3.72	46.58	35.25	43.15	74.00	30.85	Peak

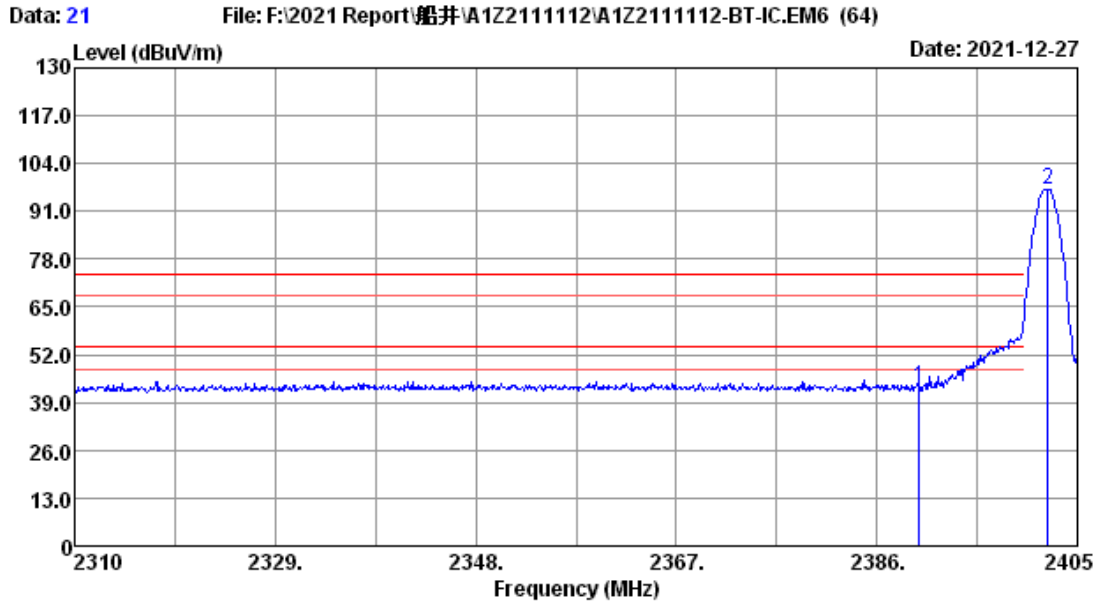
Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp factor.
 2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 3m Chamber Data no. : 16
 Dis. / Ant. : 3m 2021 MCTD1209-3006 Ant. pol. : HORIZONTAL
 Limit : RSS-247 PEAK 2.4
 Env. / Ins. : 22.1°C/51.5% Engineer : Lynn
 Test Mode : BT3.0 GFSK 2480MHz Tx

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2480.00	28.07	3.71	103.14	35.25	99.67	-----	-----	Peak
2	2483.50	28.07	3.71	49.36	35.25	45.89	74.00	28.11	Peak
3	2500.00	28.10	3.72	46.43	35.25	43.00	74.00	31.00	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp factor.
 2. The emission levels that are 20dB below the official limit are not reported.

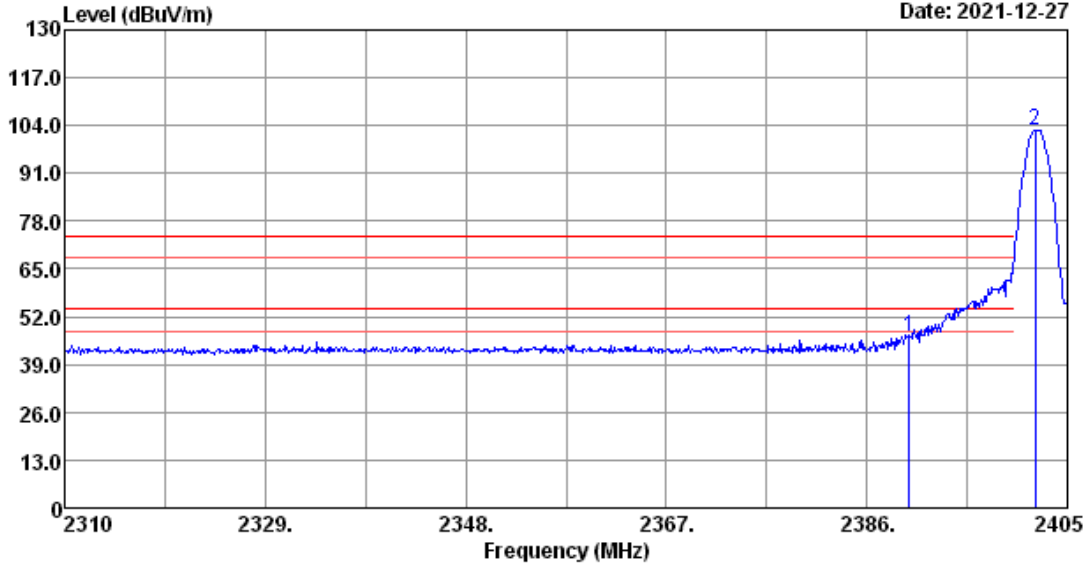


Site no. : 3m Chamber Data no. : 21
 Dis. / Ant. : 3m 2021 MCTD1209-3006 Ant. pol. : VERTICAL
 Limit : RSS-247 PEAK 2.4
 Env. / Ins. : 22.1°C/51.5% Engineer : Lynn
 Test Mode : BT3.0 8DPSK 2402MHz Tx

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2390.00	27.89	3.65	46.95	35.24	43.25	74.00	30.75	Peak
2	2402.25	27.89	3.66	100.69	35.24	97.00	-----	-----	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp factor.
 2. The emission levels that are 20dB below the official limit are not reported.

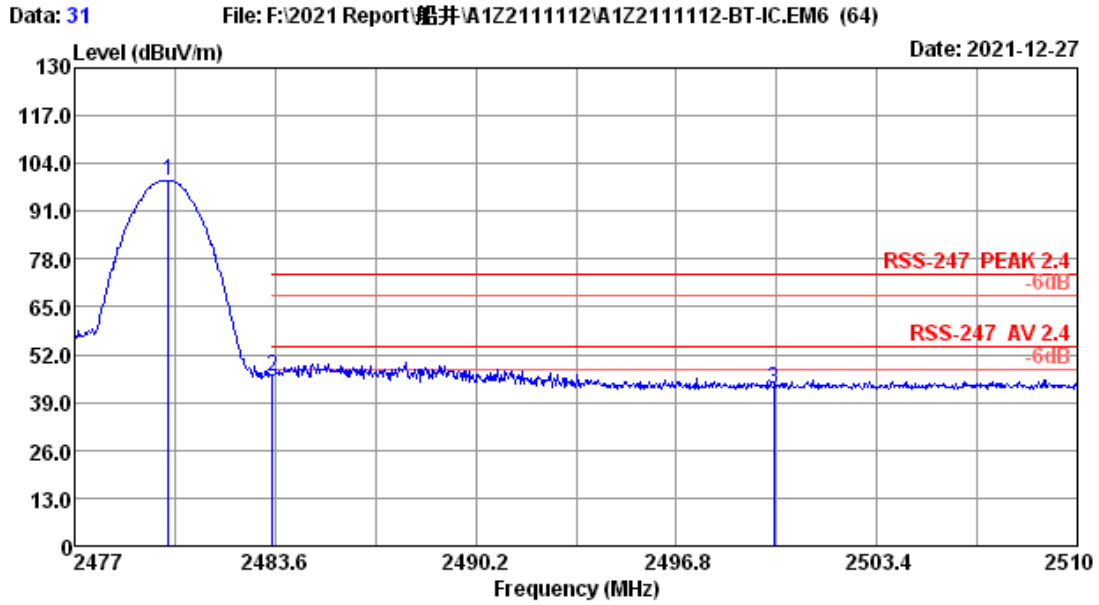
Data: 22 File: F:\2021 Report\船井\A1Z2111112\A1Z2111112-BT-IC.EM6 (64) Date: 2021-12-27



Site no. : 3m Chamber Data no. : 22
 Dis. / Ant. : 3m 2021 MCTD1209-3006 Ant. pol. : HORIZONTAL
 Limit : RSS-247 PEAK 2.4
 Env. / Ins. : 22.1°C/51.5% Engineer : Lynn
 Test Mode : BT3.0 8DPSK 2402MHz Tx

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2390.00	27.89	3.65	50.33	35.24	46.63	74.00	27.37	Peak
2	2401.96	27.89	3.66	106.44	35.24	102.75	-----	-----	Peak

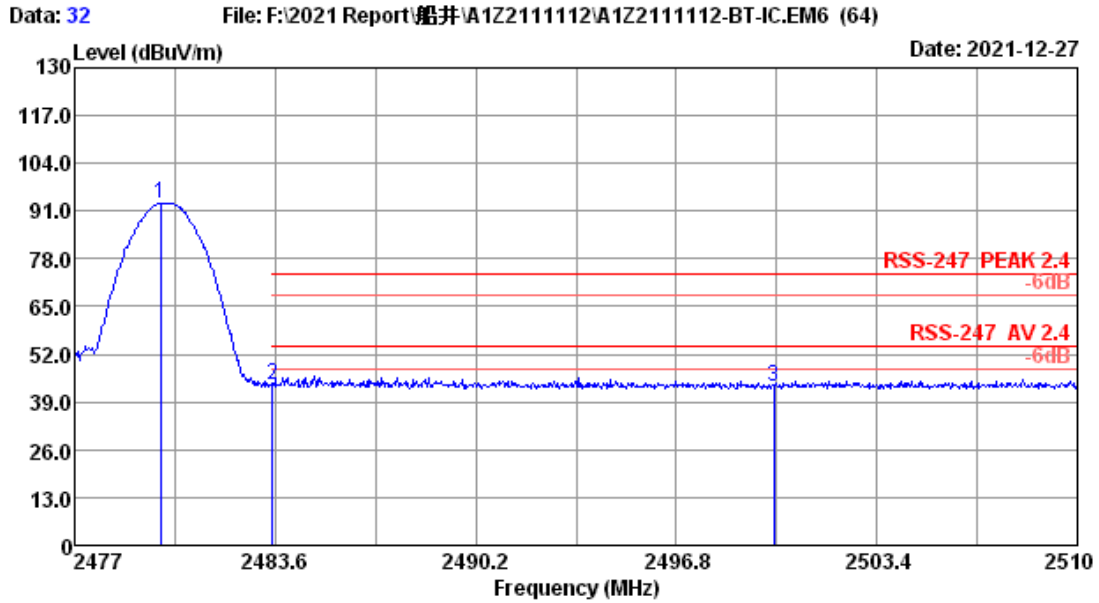
Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading - Amp factor.
 2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 3m Chamber Data no. : 31
 Dis. / Ant. : 3m 2021 MCTD1209-3006 Ant. pol. : HORIZONTAL
 Limit : RSS-247 PEAK 2.4
 Env. / Ins. : 22.1°C/51.5% Engineer : Lynn
 Test Mode : BT3.0 8DPSK 2480MHz Tx

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2480.10	28.07	3.71	102.71	35.25	99.24	-----	-----	Peak
2	2483.50	28.07	3.71	49.41	35.25	45.94	74.00	28.06	Peak
3	2500.00	28.10	3.72	46.36	35.25	42.93	74.00	31.07	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp factor.
 2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 3m Chamber Data no. : 32
 Dis. / Ant. : 3m 2021 MCTD1209-3006 Ant. pol. : VERTICAL
 Limit : RSS-247 PEAK 2.4
 Env. / Ins. : 22.1°C/51.5% Engineer : Lynn
 Test Mode : BT3.0 8DPSK 2480MHz Tx

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Amp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2479.84	28.07	3.71	96.55	35.25	93.08	-----	-----	Peak
2	2483.50	28.07	3.71	47.18	35.25	43.71	74.00	30.29	Peak
3	2500.00	28.10	3.72	46.65	35.25	43.22	74.00	30.78	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp factor.
 2. The emission levels that are 20dB below the official limit are not reported.

13.DEVIATION TO TEST SPECIFICATIONS

[NONE]

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