




TEST REPORT

For Bluetooth-LE

Report No. : **CHEW23080040** Report Verification: 

Project No...... : **SHT2307030401EW**

FCC ID..... : **2AN9S-ABX00074**

Applicant's name..... : **Arduino S.r.l.**

Address..... : **Via Andrea Appiani, 25, 20900 MONZA (Italy)**

Product Name : **Portenta C33**

Trade Mark : **Arduino**

Model No. : **ABX00074**

Listed Model(s) : **-**

Standard : **FCC CFR Title 47 Part 15 Subpart C § 15.247**

Date of receipt of test sample..... : **Jul.21, 2023**

Date of testing..... : **Jul.21, 2023- Aug.21, 2023**

Date of issue..... : **Aug.22, 2023**

Result..... : **PASS**

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Testing Laboratory Name : **Shenzhen Huatongwei International Inspection Co., Ltd.**

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The test report merely correspond to the test sample.

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1. TEST STANDARDS AND REPORT VERSION

1.1. Test Standards

The tests were performed according to following standards:

- [FCC CFR Title 47 Part 15 Subpart C § 15.247](#): Operation within the bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz
- [ANSI C63.10:2020](#): American National Standard for Testing Unlicensed Wireless Devices
- [KDB 558074 D01 15.247 Meas Guidance v05r02](#): Guidance for Compliance Measurements on Digital Transmission System, Frequency Hopping Spread Spectrum System, and Hybrid System Devices Operating under Section 15.247 of The FCC Rules

1.2. Report version

Revision No.	Date of issue	Description
N/A	2023-08-22	Original

2. TEST DESCRIPTION

Report clause	Test Items	Standard Requirement	Result	Test Engineer
5.1	Antenna Requirement	15.203/15.247(c)	PASS	Xiaoqin Li
5.2	AC Conducted Emission	15.207	PASS	Junman Wang
5.3	Peak Output Power	15.247(b)(3)	PASS	Xiaoqin Li
5.4	Power Spectral Density	15.247(e)	PASS	Xiaoqin Li
5.5	6dB Bandwidth	15.247(a)(2)	PASS	Xiaoqin Li
5.6	99% Occupied Bandwidth	-	PASS*1	Xiaoqin Li
5.7	Duty cycle	-	PASS*1	Xiaoqin Li
5.8	Conducted Band Edge and Spurious Emission	15.247(d)/15.205	PASS	Xiaoqin Li
5.9	Radiated Band Edge Emission	15.205/15.209	PASS	Yifan Wang
5.10	Radiated Spurious Emission	15.247(d)/15.205/15.209	PASS	Yifan Wang

Note:

- The measurement uncertainty is not included in the test result.
- *1: No requirement on standard, only report these test data.

3. SUMMARY

3.1. Client Information

Applicant:	Arduino S.r.l.
Address:	Via Andrea Appiani, 25, 20900 MONZA (Italy)
Manufacturer:	Arduino S.r.l.
Address:	Via Andrea Appiani, 25, 20900 MONZA (Italy)

3.2. Product Description

Main unit information:	
Product Name:	Portenta C33
Trade Mark:	Arduino
Model No.:	ABX00074
Listed Model(s):	-
Power supply:	DC 5V
Hardware version:	1.2
Software version:	1.0.2

3.3. Radio Specification Description

Bluetooth version:	V5.0
Support function:	BLE
Modulation:	GFSK
Operation frequency:	2402MHz~2480MHz
Channel number:	40
Channel separation:	2MHz
Antenna type:	Omnidirectional
Antenna gain:	1.1dBi

3.4. Testing Laboratory Information

Laboratory Name	Shenzhen Huatongwei International Inspection Co., Ltd.	
Laboratory Location	1/F, Bldg 3, Hongfa Hi-tech Industrial Park, Genyu Road, Tianliao, Gongming, Shenzhen, China	
Contact information:	Phone: 86-755-26715499 E-mail: cs@szhtw.com.cn http://www.szhtw.com.cn	
Qualifications	Type	Accreditation Number
	FCC	762235

4. TEST CONFIGURATION

4.1. Test frequency list

According to section 15.31(m), regards to the operating frequency range over 10 MHz, must select three channels which were tested. The Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, please see the below blue front.

Channel	Frequency (MHz)
00	2402
01	2404
.
19	2440
.
38	2478
39	2480

4.2. Descriptions of Test mode

For RF test items
The engineering test program was provided and enabled to make EUT continuous transmit.
For Radiated spurious emissions:
The engineering test program was provided and enabled to make EUT continuous transmit. The EUT in each of three orthogonal axis emissions had been tested, but only the worst case (X axis) data Recorded in the report.

4.3. Test sample information

Test item	HTW sample no.
RF Conducted test items	Please refer to the description in the appendix report
RF Radiated test items	YPHT23070304001
EMI test items	YPHT23070304002

Note:

RF Conducted test items: Peak Output Power, Power Spectral Density, 6dB Bandwidth, 99% Occupied Bandwidth, Duty cycle, Conducted Band Edge and Spurious Emission

RF Radiated test items: Radiated Band Edge Emission, Radiated Spurious Emission

EMI test items: AC Conducted Emission

4.4. Support unit used in test configuration and system

The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application.

The following peripheral devices and interface cables were connected during the measurement:

Whether support unit is used?			
✓ No			
Item	Equipment	Trade Name	Model No.
1			
2			

4.5. Testing environmental condition

Type	Requirement	Actual
Temperature:	15~35°C	25°C
Relative Humidity:	25~75%	50%
Air Pressure:	860~1060mbar	1000mbar

4.6. Statement of the measurement uncertainty

No.	Test Items	Measurement Uncertainty
1	AC Conducted Emission	3.21dB
2	Peak Output Power	1.07
3	Power Spectral Density	1.07
4	6dB Bandwidth	0.002%
5	99% Occupied Bandwidth	0.002%
6	Duty cycle	-
7	Conducted Band Edge and Spurious Emission	1.68dB
8	Radiated Band Edge Emission	4.54dB for 30MHz-1GHz 5.10dB for above 1GHz
9	Radiated Spurious Emission	4.54dB for 30MHz-1GHz 5.10dB for above 1GHz

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=1.96.

4.7. Equipment Used during the Test

● Conducted test item							
Used	Test Equipment	Manufacturer	Equipment No.	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
●	Signal and spectrum Analyzer	R&S	HTWE0242	FSV40	100048	2022/08/25	2023/08/24
●	Signal & Spectrum Analyzer	R&S	HTWE0262	FSW26	103440	2022/08/25	2023/08/24
●	Vector signal generator	R&S	HTWE0244	SMBV100A	260790	2023/05/23	2024/05/22
●	Test software	Tonscend	N/A	JS1120	N/A	N/A	N/A

● Conducted Emission							
Used	Test Equipment	Manufacturer	Equipment No.	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
●	EMI Test Receiver	R&S	HTWE0111	ESCI	101247	2022/8/30	2023/8/29
●	Artificial Mains	SCHWARZBECK	HTWE0113	NNLK 8121	573	2022/8/29	2023/8/28
●	Protection Network	SCHWARZBECK	HTWE0567	VTSD9561FN	00899	2022/8/29	2023/8/28
●	ISN	FCC	HTWE0148	FCC-TLISN-T2-02	20371	2022/8/29	2023/8/28
●	ISN	FCC	HTWE0150	FCC-TLISN-T8-02	20375	2022/8/29	2023/8/28
●	Test Software	R&S	N/A	EMC32	N/A	N/A	N/A

● Radiated emission- Below 1GHz							
Used	Test Equipment	Manufacturer	Equipment No.	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
●	Semi-Anechoic Chamber	Albatross projects	HTWE0127	SAC-3m-02	C11121	2018/09/30	2023/09/29
●	EMI Test Receiver	R&S	HTWE0099	ESCI	100900	2022/08/30	2023/08/29
●	Loop Antenna	R&S	HTWE0546	HFH2-Z2E	101073	2021/05/25	2024/05/24
●	Ultra-Broadband Antenna	SCHWARZBECK	HTWE0547	VULB9163	945	2022/05/23	2025/05/22
●	Pre-Amplifier	SCHWARZBECK	HTWE0295	BBV 9742	N/A	2022/11/04	2023/11/03
●	RF Connection Cable	HUBER+SUHNER	HTWE0062-01	N/A	N/A	2023/02/24	2024/02/23
●	RF Connection Cable	HUBER+SUHNER	HTWE0062-02	SUCOFLEX104	501184/4	2023/02/24	2024/02/23
●	Test Software	R&S	N/A	ES-K1	N/A	N/A	N/A

● Radiated emission- Above 1GHz							
Used	Test Equipment	Manufacturer	Equipment No.	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
●	Semi-Anechoic Chamber	Albatross projects	HTWE0122	SAC-3m-01	C11121	2018/09/27	2023/09/26
●	Spectrum Analyzer	R&S	HTWE0098	FSP40	100597	2022/08/25	2023/08/24
●	Horn Antenna	ETS	HTWE0548	3117	240120	2022/05/20	2025/05/19
●	Horn Antenna	STEATITE	HTWE0549	QMS-00880	25661	2022/05/20	2025/05/19
●	Pre-amplifier	CD	HTWE0071	PAP-0102	12004	2022/11/04	2023/11/03
●	Broadband Pre-	SCHWARZBECK	HTWE0201	BBV 9718	9718-248	2023/02/27	2024/02/26

	amplifier						
●	RF Connection Cable	HUBER+SUHNER	HTWE0120-01	6m 18GHz S Serisa	N/A	2023/02/24	2024/02/23
●	RF Connection Cable	HUBER+SUHNER	HTWE0120-02	6m 3GHz RG Serisa	N/A	2023/02/24	2024/02/23
●	RF Connection Cable	HUBER+SUHNER	HTWE0119-05	6m 3GHz RG Serisa	N/A	2023/02/24	2024/02/23
●	RF Connection Cable	HUBER+SUHNER	HTWE0120-04	6m 3GHz RG Serisa	N/A	2023/02/24	2024/02/23
●	Test Software	Audix	N/A	E3	N/A	N/A	N/A

5. TEST CONDITIONS AND RESULTS

5.1. Antenna Requirement

REQUIREMENT

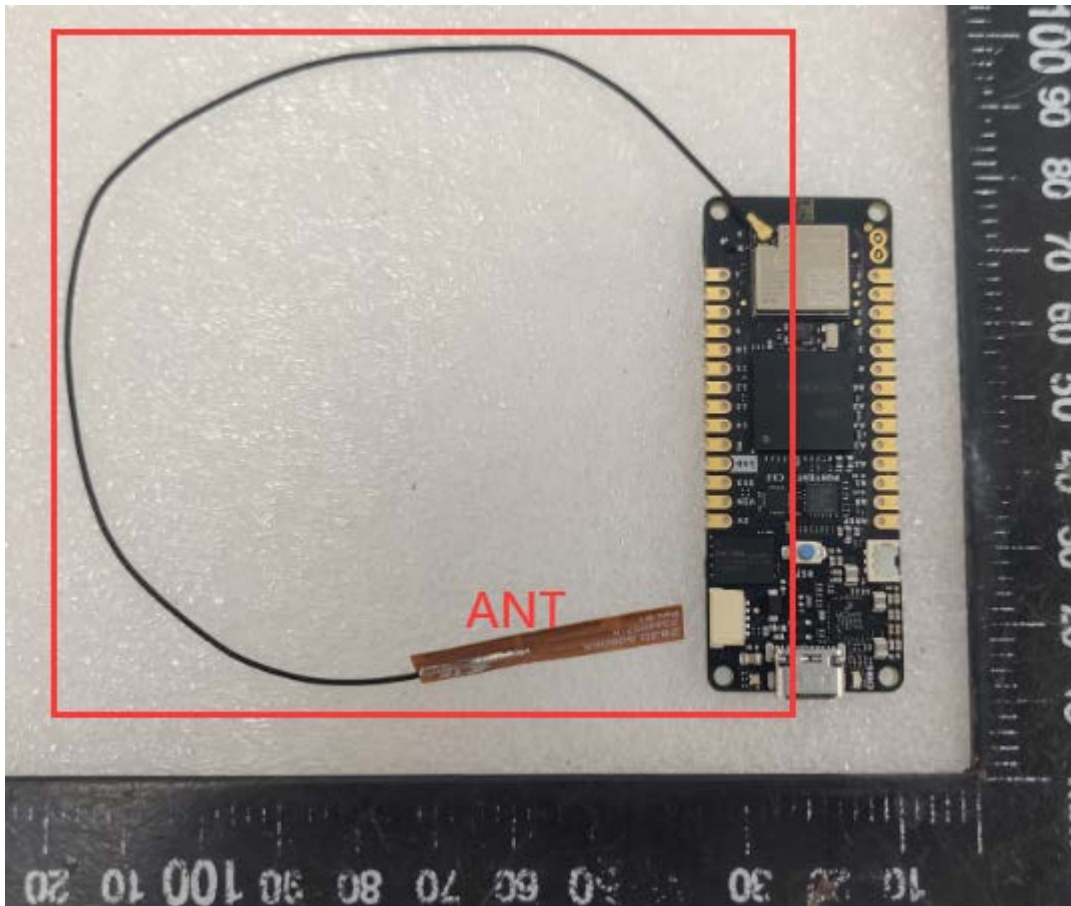
FCC CFR Title 47 Part 15 Subpart C Section 15.203:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, 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.

TEST RESULT

Passed Not Applicable

The antenna type is an Omnidirectional antenna, please refer to the below antenna photo.



5.2. AC Conducted Emission

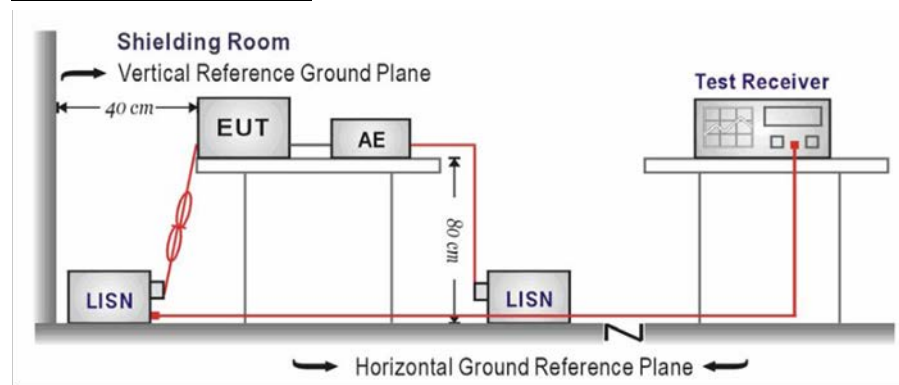
LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.207

Frequency range (MHz)	Limit (dBuV)	
	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 CONFIGURATION



TEST PROCEDURE

1. The EUT was setup according to ANSI C63.10 requirements.
2. The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface.
3. The EUT and simulators are connected to the main power through a line impedances stabilization network (LISN). The LISN provides a 50 ohm /50uH coupling impedance for the measuring equipment.
4. The peripheral devices are also connected to the main power through a LISN. (Please refer to the block diagram of the test setup and photographs)
5. Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source.
6. The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length.
7. Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9 kHz.
8. During the above scans, the emissions were maximized by cable manipulation.

TEST MODE

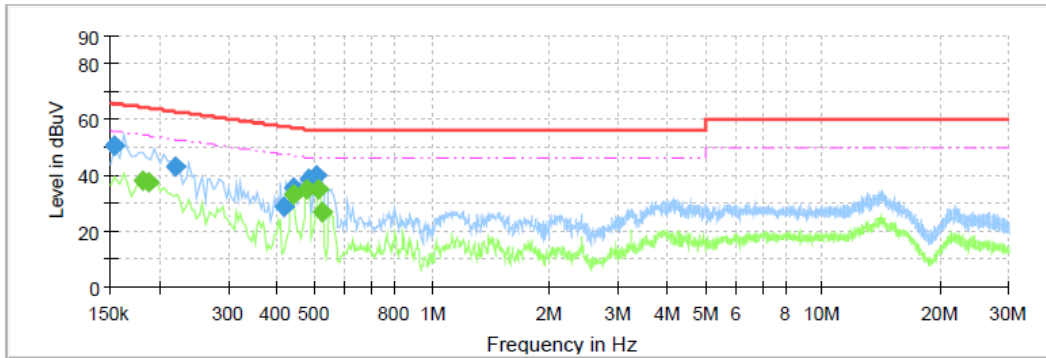
Refer to the clause 4.2

TEST RESULT

Passed Not Applicable

Test Line:

L

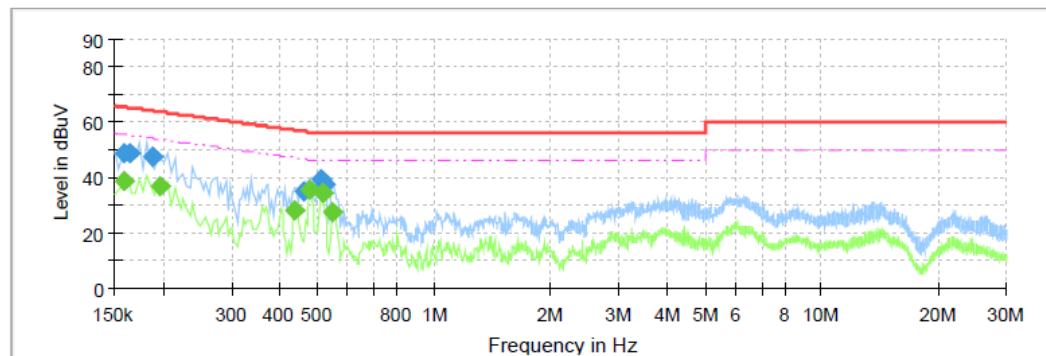


Final Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Corr. (dB)
0.154000	50.61	---	65.78	15.18	L1	10.0
0.182000	---	38.37	54.39	16.03	L1	10.0
0.187500	---	37.57	54.15	16.58	L1	10.0
0.219500	43.36	---	62.84	19.47	L1	10.0
0.415500	28.87	---	57.54	28.67	L1	10.0
0.439500	35.77	---	57.07	21.30	L1	10.0
0.439500	---	32.99	47.07	14.08	L1	10.0
0.479500	---	34.87	46.35	11.48	L1	10.0
0.483500	38.98	---	56.28	17.30	L1	10.0
0.507500	39.95	---	56.00	16.05	L1	10.0
0.511500	---	34.72	46.00	11.28	L1	10.0
0.523500	---	26.98	46.00	19.02	L1	10.0

Test Line:

N



Final Result

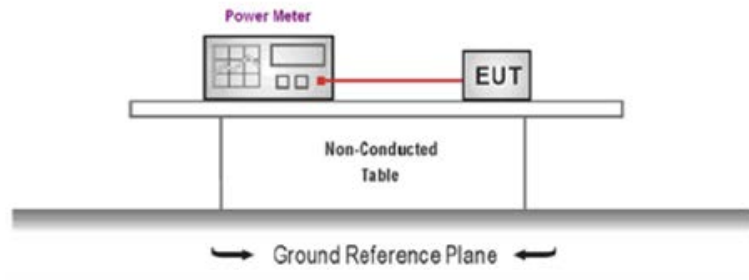
Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Corr. (dB)
0.159500	---	38.94	55.49	16.55	N	10.0
0.159500	48.95	---	65.49	16.54	N	10.0
0.163500	48.86	---	65.28	16.42	N	10.0
0.187500	47.52	---	64.15	16.62	N	10.0
0.195500	---	36.94	53.80	16.86	N	10.0
0.435500	---	28.35	47.15	18.79	N	10.0
0.463500	35.12	---	56.63	21.51	N	10.0
0.479500	---	35.85	46.35	10.50	N	10.0
0.511500	39.18	---	56.00	16.82	N	10.0
0.515500	---	34.20	46.00	11.80	N	10.0
0.523500	37.23	---	56.00	18.77	N	10.0
0.547500	---	27.71	46.00	18.29	N	10.0

5.3. Peak Output Power

LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (b)(3): 30dBm

TEST CONFIGURATION



TEST PROCEDURE

1. The EUT was tested according to ANSI C63.10 and KDB 558074 D01 requirements.
2. The maximum peak conducted output power may be measured using a broadband peak RF power meter.
3. The power meter shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall utilize a fast-responding diode detector.
4. Record the measurement data.

TEST MODE

Refer to the clause 4.2

TEST RESULT

Passed Not Applicable

TEST DATA

Refer to the appendix report

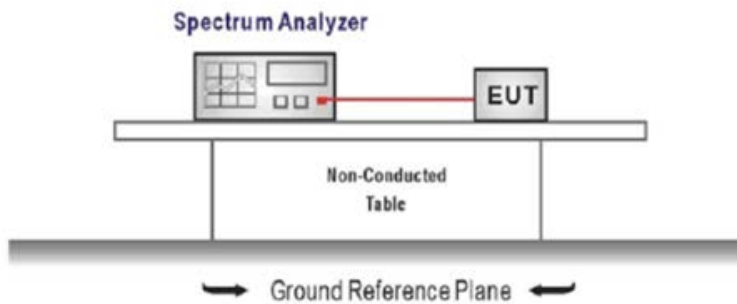
5.4. Power Spectral Density

LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (e):

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

TEST CONFIGURATION



TEST PROCEDURE

1. Connect the antenna port(s) to the spectrum analyzer input,
2. Configure the spectrum analyzer as shown below:
Center frequency=DTS channel center frequency
Span =1.5 times the DTS bandwidth
RBW = 3 kHz ≤ RBW ≤ 100 kHz, VBW ≥ 3 × RBW
Sweep time = auto couple
Detector = peak
Trace mode = max hold
3. Place the radio in continuous transmit mode, allow the trace to stabilize, view the transmitter wave form on the spectrum analyzer.
4. Use the peak marker function to determine the maximum amplitude level within the RBW.
5. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

TEST MODE

Refer to the clause 4.2

TEST RESULT

Passed Not Applicable

TEST DATA

Refer to the appendix report

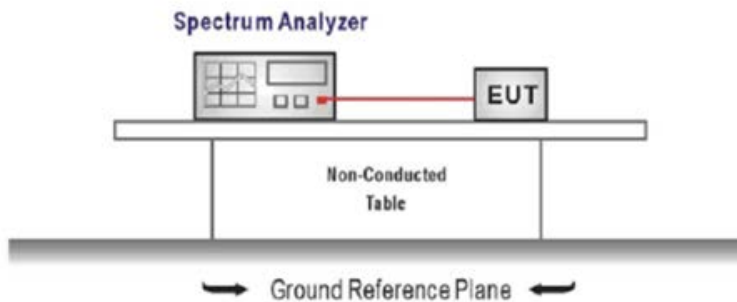
5.5. 6dB bandwidth

LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (a)(2):

For digital modulation systems, the minimum 6 dB bandwidth shall be at least 500 kHz.

TEST CONFIGURATION



TEST PROCEDURE

1. Connect the antenna port(s) to the spectrum analyzer input.
2. Configure the spectrum analyzer as shown below (enter all losses between the transmitter output and the spectrum analyzer).
Center Frequency =DTS channel center frequency
Span=2 x DTS bandwidth
RBW = 100 kHz, VBW \geq 3 \times RBW
Sweep time= auto couple
Detector = Peak
Trace mode = max hold
3. Place the radio in continuous transmit mode, allow the trace to stabilize, view the transmitter waveform on the spectrum analyzer.
4. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission, and record the pertinent measurements.

TEST MODE

Refer to the clause 4.2

TEST RESULT

Passed Not Applicable

TEST DATA

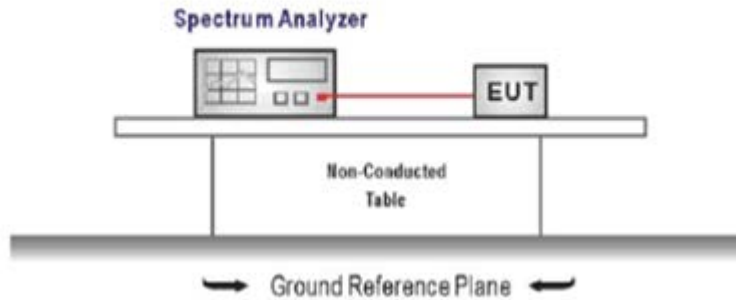
Refer to the appendix report

5.6. 99% Occupied Bandwidth

LIMIT

N/A

TEST CONFIGURATION



TEST PROCEDURE

1. Connect the antenna port(s) to the spectrum analyzer input.
2. Configure the spectrum analyzer as shown below (enter all losses between the transmitter output and the spectrum analyzer).
Center Frequency = channel center frequency
Span $\geq 1.5 \times$ OBW
RBW = 1%~5%OBW
VBW $\geq 3 \times$ RBW
Sweep time = auto couple
Detector = Peak
Trace mode = max hold
3. Place the radio in continuous transmit mode, allow the trace to stabilize, view the transmitter waveform on the spectrum analyzer.

TEST MODE

Refer to the clause 4.2

TEST RESULT

Passed Not Applicable

TEST DATA

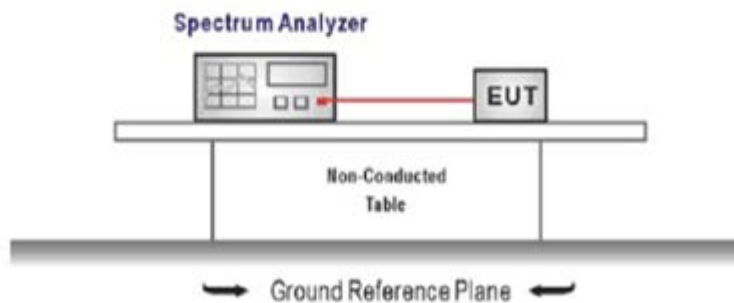
Refer to the appendix report

5.7. Duty Cycle

LIMIT

N/A

TEST CONFIGURATION



TEST PROCEDURE

1. The transmitter output was connected to the spectrum analyzer through an attenuator, the path loss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT transmit continuously
3. Use the following spectrum analyzer settings:
Span=zero span, Frequency=centered channel, RBW= 1 MHz, VBW \geq RBW
Sweep=as necessary to capture the entire dwell time,
Detector function = peak, Trigger mode
4. Measure and record the duty cycle data

TEST MODE

Refer to the clause 4.2

TEST DATA

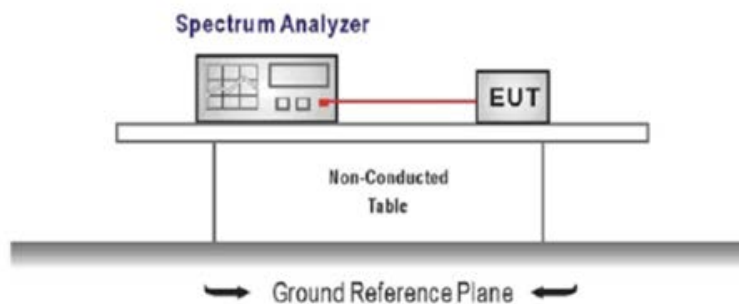
Refer to the appendix report

5.8. Conducted Band edge and Spurious Emission

LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (d): In any 100 kHz bandwidth outside the frequency band in which the spread spectrum 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.

TEST CONFIGURATION



TEST PROCEDURE

1. Connect the antenna port(s) to the spectrum analyzer input.
2. Emission level measurement
Set the center frequency and span to encompass frequency range to be measured
RBW = 100 kHz, VBW $\geq 3 \times$ RBW
Detector = peak, Sweep time = auto couple, Trace mode = max hold
Allow trace to fully stabilize
Use the peak marker function to determine the maximum amplitude level.
3. Place the radio in continuous transmit mode, allow the trace to stabilize, view the transmitter waveform on the spectrum analyzer.
4. Ensure that the amplitude of all unwanted emission outside of the authorized frequency band excluding restricted frequency bands) are attenuated by at least the minimum requirements specified (at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz). Report the three highest emission relative to the limit.

TEST MODE

Refer to the clause 4.2

TEST RESULT

Passed Not Applicable

TEST DATA

Refer to the appendix report

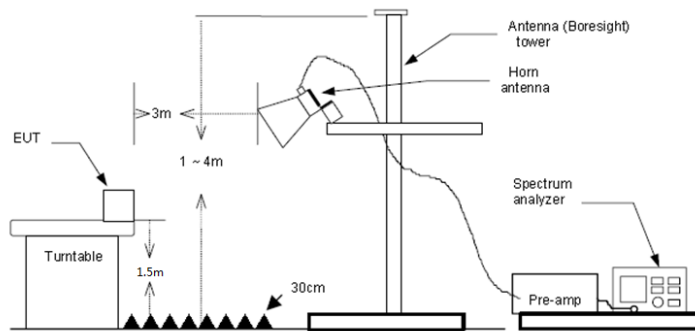
5.9. Radiated Band edge Emission

LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (d):

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, Radiated Emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the Radiated Emissions limits specified in §15.209(a) (see §15.205(c)).

TEST CONFIGURATION



TEST PROCEDURE

- The EUT was setup and tested according to ANSI C63.10 .
- The EUT is placed on a turn table which is 1.5 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level.
- The EUT was positioned such that the distance from antenna to the EUT was 3 meters.
- The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10 on radiated measurement.
- Use the following spectrum analyzer settings:
 - Span shall wide enough to fully capture the emission being measured
 - Set RBW=100kHz for <1GHz, VBW=3*RBW, Sweep time=auto, Detector=peak, Trace=max hold
 - Set RBW=1MHz, VBW=3MHz for >1GHz, Sweep time=auto, Detector=peak, Trace=max hold for Peak measurement
 For average measurement:
 - VBW=10Hz, When duty cycle is no less than 98 percent
 - VBW \geq 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation, so refer to this clause 5.6 duty cycle.

TEST MODE

Refer to the clause 4.2

TEST RESULT

Passed Not Applicable

Note:

- Level= Reading + Factor; Factor =Antenna Factor+ Cable Loss- Preamp Factor
- Over Limit = Level- Limit
- Average measurement was not performed if peak level is lower than average limit(54 dBuV/m).

BLE 1M

Test channel		CH00			Polarity			Horizontal		
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark	
1	2310.00	46.98	27.86	4.01	37.55	41.30	74.00	-32.70	Peak	
2	2390.03	46.52	27.54	4.31	37.55	40.82	74.00	-33.18	Peak	

Test channel		CH00			Polarity			Vertical		
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark	
1	2310.00	47.42	27.86	4.01	37.55	41.74	74.00	-32.26	Peak	
2	2390.03	47.71	27.54	4.31	37.55	42.01	74.00	-31.99	Peak	

Test channel		CH39			Polarity			Horizontal		
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark	
1	2483.50	49.26	27.33	4.18	37.64	43.13	74.00	-30.87	Peak	
2	2500.00	47.07	27.30	4.19	37.67	40.89	74.00	-33.11	Peak	

Test channel		CH39			Polarity			Vertical		
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark	
1	2483.50	46.89	27.33	4.18	37.64	40.76	74.00	-33.24	Peak	
2	2500.00	46.44	27.30	4.19	37.67	40.26	74.00	-33.74	Peak	

BLE 2M

Test channel		CH00			Polarity			Horizontal		
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark	
1	2310.00	46.70	27.86	4.01	37.55	41.02	74.00	-32.98	Peak	
2	2390.03	47.94	27.54	4.31	37.55	42.24	74.00	-31.76	Peak	

Test channel		CH00			Polarity			Vertical		
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark	
1	2310.00	46.52	27.86	4.01	37.55	40.84	74.00	-33.16	Peak	
2	2390.03	47.73	27.54	4.31	37.55	42.03	74.00	-31.97	Peak	

Test channel		CH39			Polarity			Horizontal		
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark	
1	2483.50	54.70	27.33	4.18	37.64	48.57	74.00	-25.43	Peak	
2	2500.00	48.46	27.30	4.19	37.67	42.28	74.00	-31.72	Peak	

Test channel		CH39			Polarity			Vertical		
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark	
1	2483.50	47.78	27.33	4.18	37.64	41.65	74.00	-32.35	Peak	
2	2500.00	47.10	27.30	4.19	37.67	40.92	74.00	-33.08	Peak	

5.10. Radiated Spurious Emission

LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.209

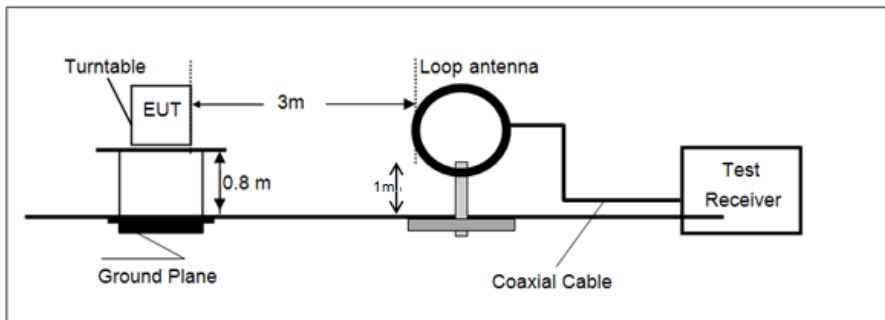
Frequency	Limit (dBuV/m)	Value
0.009 MHz ~0.49 MHz	2400/F(kHz) @300m	Quasi-peak
0.49 MHz ~ 1.705 MHz	24000/F(kHz) @30m	Quasi-peak
1.705 MHz ~30 MHz	30 @30m	Quasi-peak

Note: Limit dBuV/m @3m = Limit dBuV/m @300m + 40*log(300/3)= Limit dBuV/m @300m +80,
 Limit dBuV/m @3m = Limit dBuV/m @30m +40*log(30/3)= Limit dBuV/m @30m + 40.

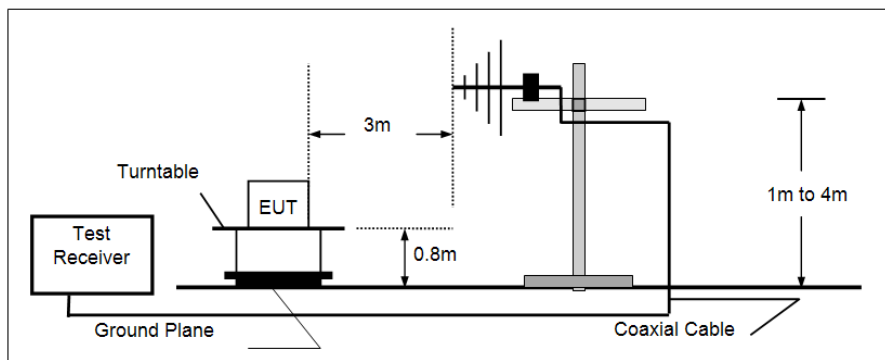
Frequency	Limit (dBuV/m @3m)	Value
30MHz~88MHz	40.00	Quasi-peak
88MHz~216MHz	43.50	Quasi-peak
216MHz~960MHz	46.00	Quasi-peak
960MHz~1GHz	54.00	Quasi-peak
Above 1GHz	54.00	Average
	74.00	Peak

TEST CONFIGURATION

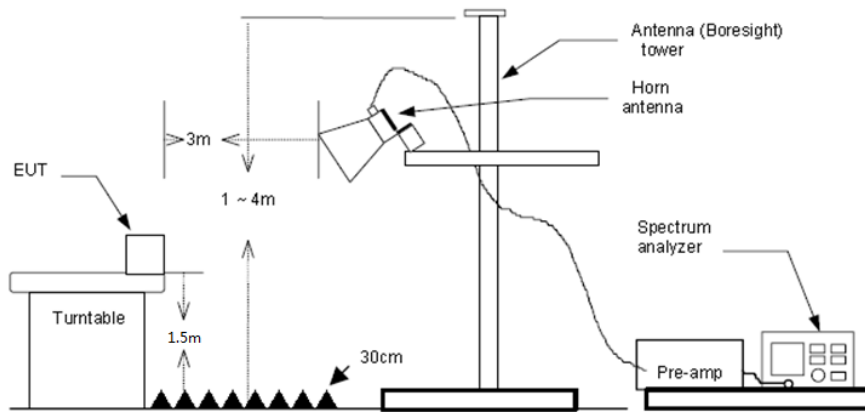
➤ 9 kHz ~ 30 MHz



➤ 30 MHz ~ 1 GHz



➤ Above 1 GHz



TEST PROCEDURE

1. The EUT was setup and tested according to ANSI C63.10 .
2. The EUT is placed on a turn table which is 0.8 meter above ground for below 1 GHz, and 1.5 m for above 1 GHz. The turn table is rotated 360 degrees to determine the position of the maximum emission level.
3. The EUT was set 3 meters from the receiving antenna, which was mounted on the top of a variable height antenna tower.
4. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.
5. Set to the maximum power setting and enable the EUT transmit continuously.
6. Use the following spectrum analyzer settings
 - a) Span shall wide enough to fully capture the emission being measured;
 - b) Below 1 GHz:
 - RBW=120 kHz, VBW=300 kHz, Sweep=auto, Detector function=peak, Trace=max hold;
 - If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
 - c) Set RBW=1MHz, VBW=3MHz for >1GHz, Sweep time=auto, Detector=peak, Trace=max hold for Peak measurement
 - For average measurement:
 - VBW=10Hz, When duty cycle is no less than 98 percent
 - $VBW \geq 1/T$, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation, so refer to this clause 5.6 duty cycle.

TEST MODE

Refer to the clause 4.2

TEST RESULT

Passed Not Applicable

Note:

- 1) Level= Reading + Factor/Transd; Factor/Transd =Antenna Factor+ Cable Loss- Preamp Factor
- 2) Over Limit = Level– Limit
- 3) Average measurement was not performed if peak level is lower than average limit(54 dBuV/m) for above 1GHz.

For 9 kHz ~ 30 MHz

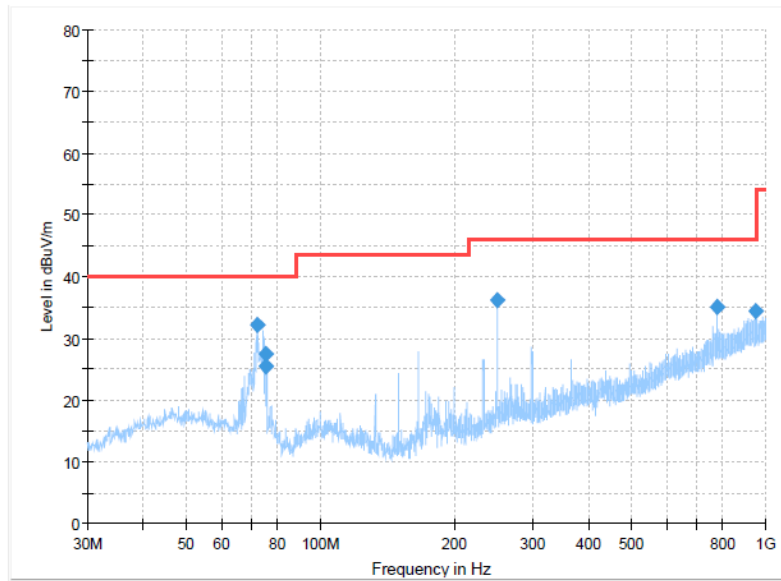
The EUT was pre-scanned this frequency band, found the radiated level 20dB lower than the limit, so don't show data on this report.

For 30 MHz ~ 1000 MHz

Have pre-scan all test channel, found CH39 which it was worst case, so only show the worst case's data on this report.

Polarization:

Horizontal

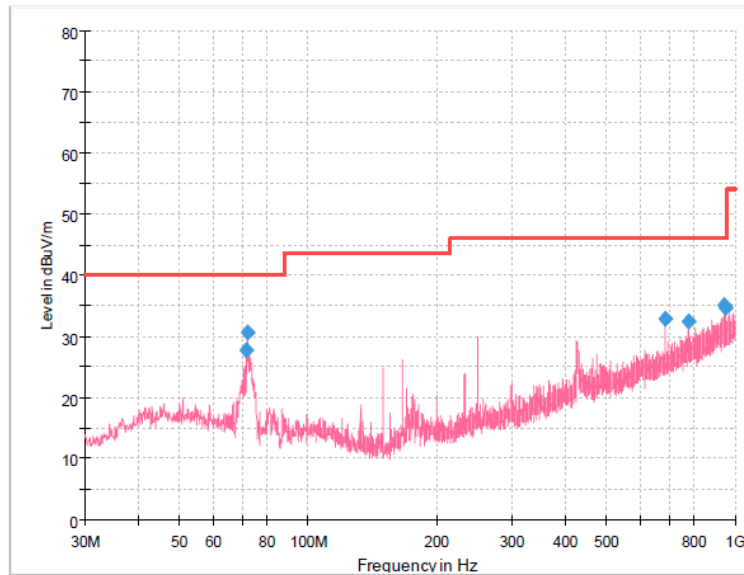


Final Result

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
72.437500	32.14	40.00	7.86	300.0	H	153.0	-14.1
75.226250	27.50	40.00	12.50	300.0	H	319.0	-15.2
75.590000	25.48	40.00	14.52	300.0	H	319.0	-15.3
250.068750	36.25	46.00	9.75	100.0	H	143.0	-8.9
777.021250	35.09	46.00	10.91	300.0	H	32.0	4.1
948.468750	34.37	46.00	11.63	300.0	H	153.0	7.1

Polarization:

Vertical



Final Result

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
71.588750	27.74	40.00	12.26	100.0	V	187.0	-13.7
71.952500	30.69	40.00	9.31	100.0	V	187.0	-13.8
687.538750	32.81	46.00	13.19	100.0	V	10.0	2.1
775.323750	32.31	46.00	13.69	100.0	V	275.0	4.1
945.316250	35.14	46.00	10.86	100.0	V	179.0	7.1
948.590000	34.56	46.00	11.44	100.0	V	69.0	7.1

For 1 GHz ~ 25 GHz**BLE 1M**

Test channel		CH00			Polarity			Horizontal		
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark	
1	3200.50	43.60	28.90	4.84	37.52	39.82	74.00	-34.18	Peak	
2	4478.63	40.49	30.56	5.94	36.13	40.86	74.00	-33.14	Peak	
3	5762.24	40.30	31.92	6.66	35.22	43.66	74.00	-30.34	Peak	
4	9251.58	36.84	39.10	9.26	34.37	50.83	74.00	-23.17	Peak	

Test channel		CH00			Polarity			Vertical		
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark	
1	4256.33	45.79	30.03	5.77	36.58	45.01	74.00	-28.99	Peak	
2	5762.24	46.39	31.92	6.66	35.22	49.75	74.00	-24.25	Peak	
3	7527.83	38.20	36.14	7.75	33.97	48.12	74.00	-25.88	Peak	
4	9809.40	35.51	39.32	9.50	33.53	50.80	74.00	-23.20	Peak	

Test channel		CH19			Polarity			Horizontal		
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark	
1	3192.37	41.24	28.90	4.80	37.43	37.51	74.00	-36.49	Peak	
2	5393.22	38.07	31.57	6.45	35.36	40.73	74.00	-33.27	Peak	
3	8022.46	35.40	37.00	8.07	33.78	46.69	74.00	-27.31	Peak	
4	9784.47	35.44	39.30	9.48	33.44	50.78	74.00	-23.22	Peak	

Test channel		CH19			Polarity			Vertical		
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark	
1	3983.75	39.74	29.77	5.60	36.91	38.20	74.00	-35.80	Peak	
2	5034.99	37.82	31.61	6.09	35.53	39.99	74.00	-34.01	Peak	
3	6461.58	37.66	33.67	7.05	34.24	44.14	74.00	-29.86	Peak	
4	9759.59	34.92	39.30	9.46	33.66	50.02	74.00	-23.98	Peak	

Test channel		CH39			Polarity			Horizontal		
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark	
1	3662.78	40.35	29.20	5.09	37.07	37.57	74.00	-36.43	Peak	
2	5034.99	38.25	31.61	6.09	35.53	40.42	74.00	-33.58	Peak	
3	7063.69	36.66	35.41	7.41	33.95	45.53	74.00	-28.47	Peak	
4	9710.03	35.91	39.30	9.41	34.11	50.51	74.00	-23.49	Peak	

Test channel		CH39			Polarity			Vertical		
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark	
1	3454.49	41.34	28.73	4.96	37.55	37.48	74.00	-36.52	Peak	
2	4641.12	39.67	30.98	5.84	36.24	40.25	74.00	-33.75	Peak	
3	8022.46	35.30	37.00	8.07	33.78	46.59	74.00	-27.41	Peak	
4	9809.40	35.42	39.32	9.50	33.53	50.71	74.00	-23.29	Peak	

BLE 2M

Test channel		CH00			Polarity			Horizontal		
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark	
1	3064.96	41.04	28.66	4.64	37.35	36.99	74.00	-37.01	Peak	
2	5073.59	37.51	31.84	6.22	35.62	39.95	74.00	-34.05	Peak	
3	8042.90	35.78	37.00	8.19	33.75	47.22	74.00	-26.78	Peak	
4	9809.40	35.14	39.32	9.50	33.53	50.43	74.00	-23.57	Peak	

Test channel		CH00			Polarity			Vertical		
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark	
1	4321.84	40.36	30.29	5.84	36.48	40.01	74.00	-33.99	Peak	
2	5462.30	37.96	31.80	6.60	35.30	41.06	74.00	-32.94	Peak	
3	8063.40	35.70	37.00	8.19	33.87	47.02	74.00	-26.98	Peak	
4	11084.27	36.26	40.25	10.06	35.94	50.63	74.00	-23.37	Peak	

Test channel		CH19			Polarity			Horizontal		
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark	
1	3072.77	41.15	28.69	4.64	37.36	37.12	74.00	-36.88	Peak	
2	4547.56	39.62	30.70	6.21	36.19	40.34	74.00	-33.66	Peak	
3	6747.34	37.29	34.10	7.25	34.18	44.46	74.00	-29.54	Peak	
4	9784.47	35.61	39.30	9.48	33.44	50.95	74.00	-23.05	Peak	

Test channel		CH19			Polarity			Vertical		
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark	
1	3057.17	40.17	28.63	4.64	37.34	36.10	74.00	-37.90	Peak	
2	4594.10	39.01	30.88	5.95	36.13	39.71	74.00	-34.29	Peak	
3	7081.70	36.09	35.55	7.45	33.91	45.18	74.00	-28.82	Peak	
4	9784.47	35.20	39.30	9.48	33.44	50.54	74.00	-23.46	Peak	

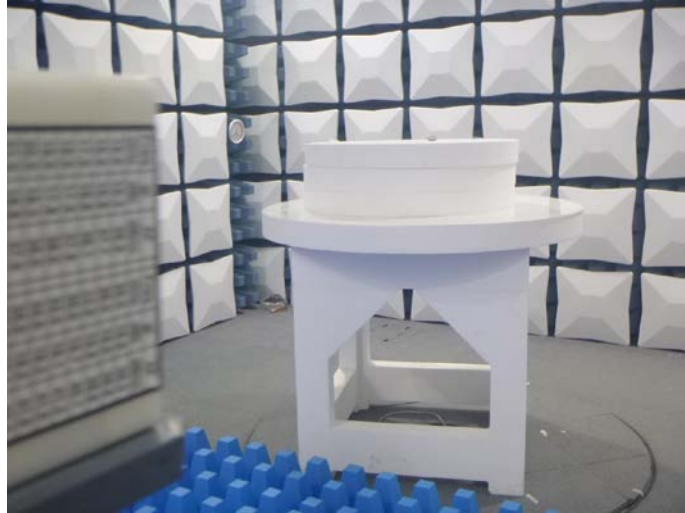
Test channel		CH39			Polarity			Horizontal		
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark	
1	3057.17	42.48	28.63	4.64	37.34	38.41	74.00	-35.59	Peak	
2	4024.52	41.47	29.85	5.56	36.98	39.90	74.00	-34.10	Peak	
3	7840.75	36.42	36.36	7.86	33.77	46.87	74.00	-27.13	Peak	
4	9784.47	35.27	39.30	9.48	33.44	50.61	74.00	-23.39	Peak	

Test channel		CH39			Polarity			Vertical		
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark	
1	3625.67	40.61	29.25	5.07	37.27	37.66	74.00	-36.34	Peak	
2	5047.83	38.28	31.69	6.09	35.45	40.61	74.00	-33.39	Peak	
3	7264.28	35.76	36.03	7.66	34.35	45.10	74.00	-28.90	Peak	
4	9784.47	35.36	39.30	9.48	33.44	50.70	74.00	-23.30	Peak	

6. TEST SETUP PHOTOS

Radiated Emission





AC Conducted Emission



7. EXTERNAL AND INTERNAL PHOTOS

Refer to the test report No. CHTEW23080039

8. APPENDIX REPORT

APPENDIX REPORT

Project No.	SHT2307030401EW	Radio Specification	Bluetooth BLE
Test sample No.	YPHT23070304001	Model No.	ABX00074
Start test date	2023-07-27	Finish date	2023-07-27
Temperature	24.9°C	Humidity	42%
Test Engineer	Xiaoqin Li	Auditor	Xiaodong Zheo

Appendix clause	Test item	Result
A	Peak Output Power	PASS
B	Power Spectral Density	PASS
C	6 dB Bandwidth	PASS
D	99% Occupied Bandwidth	PASS
E	Duty cycle	PASS
F	Band edge and Spurious Emissions (conducted)	PASS

Appendix A: Peak Output Power

Test rate	Channel	Peak Output power (dBm)	Average Output power (dBm)	Limit (dBm)	Result
1Mbps	00	4.23	4.21	≤ 30.00	Pass
	19	2.51	2.48		
	39	-0.71	-0.75		
2Mbps	00	4.32	4.26	≤ 30.00	Pass
	19	2.79	2.44		
	39	-0.52	-0.85		

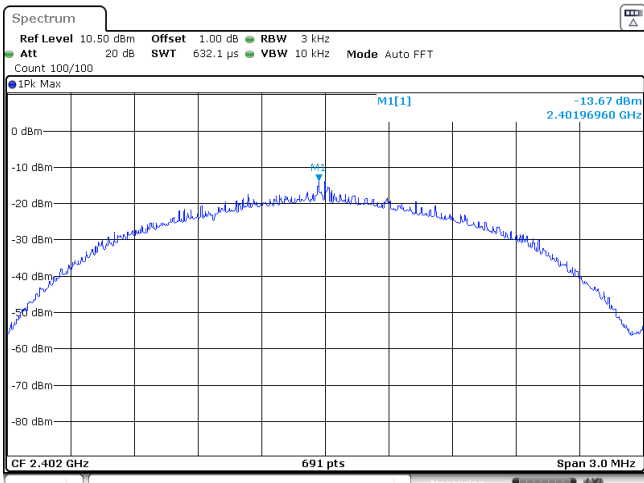
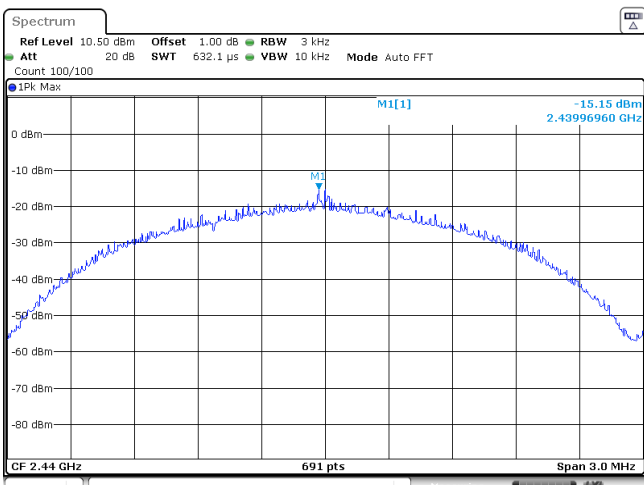
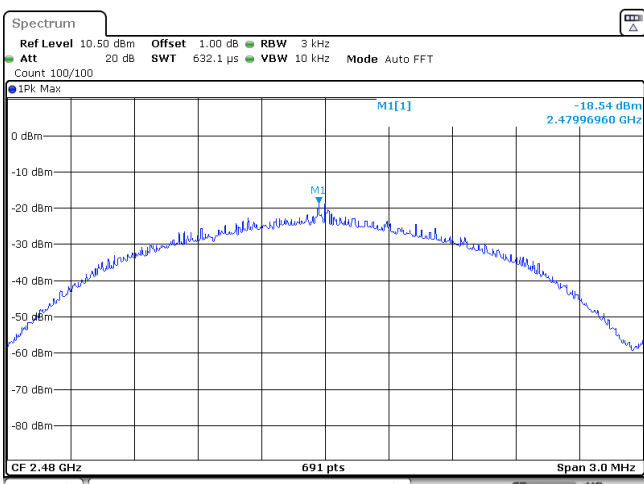
Test rate: 1Mbps	
CH00	<p>Ref Level 10.50 dBm Offset 1.00 dB RBW 2 MHz Att 20 dB SWT 1 ms VBW 5 MHz Mode Auto Sweep Count 500/500</p> <p>4.23 dBm 2.40196380 GHz</p> <p>CF 2.402 GHz 691 pts Span 5.0 MHz</p>
CH19	<p>Ref Level 10.50 dBm Offset 1.00 dB RBW 2 MHz Att 20 dB SWT 1 ms VBW 5 MHz Mode Auto Sweep Count 500/500</p> <p>2.51 dBm 2.43985530 GHz</p> <p>CF 2.44 GHz 691 pts Span 5.0 MHz</p>
CH39	<p>Ref Level 10.50 dBm Offset 1.00 dB RBW 2 MHz Att 20 dB SWT 1 ms VBW 5 MHz Mode Auto Sweep Count 500/500</p> <p>-0.71 dBm 2.47991320 GHz</p> <p>CF 2.48 GHz 691 pts Span 5.0 MHz</p>

Test rate: 2Mbps	
CH00	<p>Ref Level 10.50 dBm Offset 1.00 dB RBW 3 MHz Att 20 dB SWT 1 ms VBW 10 MHz Mode Auto Sweep Count 500/500</p> <p>4.32 dBm 2.4019570 GHz</p> <p>CF 2.402 GHz 691 pts Span 10.0 MHz</p>
CH19	<p>Ref Level 10.50 dBm Offset 1.00 dB RBW 3 MHz Att 20 dB SWT 1 ms VBW 10 MHz Mode Auto Sweep Count 500/500</p> <p>2.79 dBm 2.4399280 GHz</p> <p>CF 2.44 GHz 691 pts Span 10.0 MHz</p>
CH39	<p>Ref Level 10.50 dBm Offset 1.00 dB RBW 3 MHz Att 20 dB SWT 1 ms VBW 10 MHz Mode Auto Sweep Count 500/500</p> <p>-0.52 dBm 2.4800000 GHz</p> <p>CF 2.48 GHz 691 pts Span 10.0 MHz</p>

Appendix B: Power Spectral Density

Test rate	Channel	Power Spectral Density(dBm/3KHz)	Limit (dBm/3KHz)	Result
1Mbps	00	-11.88	≤8.00	Pass
	19	-13.62		
	39	-16.94		
2Mbps	00	-13.67	≤8.00	Pass
	19	-15.15		
	39	-18.54		

Test rate: 1Mbps	
CH00	<p>Spectrum plot for CH00. The plot shows a signal peak at 2.40199130 GHz with a power level of -11.88 dBm. The y-axis represents power in dBm, ranging from 0 to -80. The x-axis represents frequency in GHz, ranging from 2.402 to 2.412. The plot includes parameters: Ref Level 10.50 dBm, Att 20 dB, Offset 1.00 dB, RBW 3 kHz, SWT 632.3 μs, VBW 10 kHz, Mode Auto FFT, Count 100/100, CF 2.402 GHz, 691 pts, Span 1.0 MHz.</p>
CH19	<p>Spectrum plot for CH19. The plot shows a signal peak at 2.43999130 GHz with a power level of -13.62 dBm. The y-axis represents power in dBm, ranging from 0 to -80. The x-axis represents frequency in GHz, ranging from 2.44 to 2.45. The plot includes parameters: Ref Level 10.50 dBm, Att 20 dB, Offset 1.00 dB, RBW 3 kHz, SWT 632.3 μs, VBW 10 kHz, Mode Auto FFT, Count 100/100, CF 2.44 GHz, 691 pts, Span 1.0 MHz.</p>
CH39	<p>Spectrum plot for CH39. The plot shows a signal peak at 2.47999130 GHz with a power level of -16.94 dBm. The y-axis represents power in dBm, ranging from 0 to -80. The x-axis represents frequency in GHz, ranging from 2.48 to 2.49. The plot includes parameters: Ref Level 10.50 dBm, Att 20 dB, Offset 1.00 dB, RBW 3 kHz, SWT 632.3 μs, VBW 10 kHz, Mode Auto FFT, Count 100/100, CF 2.48 GHz, 691 pts, Span 1.0 MHz.</p>

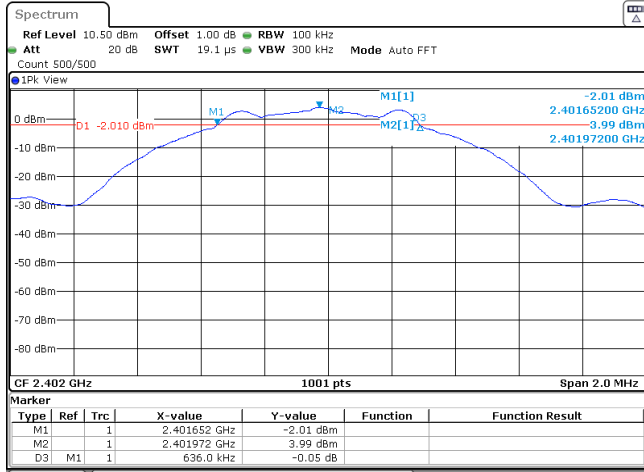
Test rate: 2Mbps	
CH00	 <p>Spectrum plot for CH00. The plot shows a signal peak at 2.40196960 GHz with a power level of -13.67 dBm. The plot includes parameters: Ref Level 10.50 dBm, Att 20 dB, Offset 1.00 dB, RBW 3 kHz, SWT 632.1 μs, VBW 10 kHz, Mode Auto FFT, Count 100/100, IPK Max, M1[1], CF 2.402 GHz, 691 pts, Span 3.0 MHz.</p>
CH19	 <p>Spectrum plot for CH19. The plot shows a signal peak at 2.43996960 GHz with a power level of -15.15 dBm. The plot includes parameters: Ref Level 10.50 dBm, Att 20 dB, Offset 1.00 dB, RBW 3 kHz, SWT 632.1 μs, VBW 10 kHz, Mode Auto FFT, Count 100/100, IPK Max, M1[1], CF 2.44 GHz, 691 pts, Span 3.0 MHz.</p>
CH39	 <p>Spectrum plot for CH39. The plot shows a signal peak at 2.47996960 GHz with a power level of -18.54 dBm. The plot includes parameters: Ref Level 10.50 dBm, Att 20 dB, Offset 1.00 dB, RBW 3 kHz, SWT 632.1 μs, VBW 10 kHz, Mode Auto FFT, Count 100/100, IPK Max, M1[1], CF 2.48 GHz, 691 pts, Span 3.0 MHz.</p>

Appendix C: 6dB bandwidth

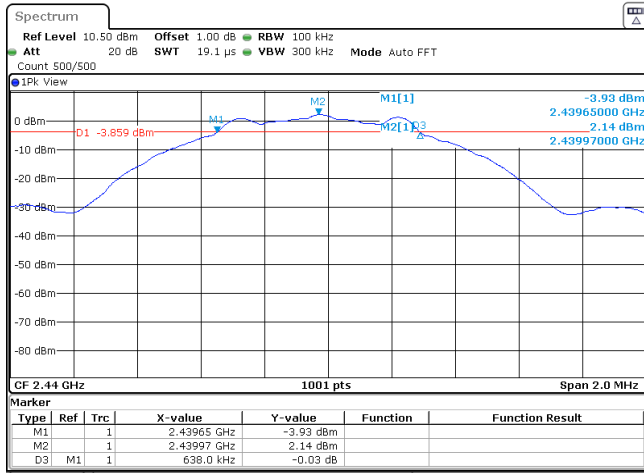
Type	Channel	6dB Bandwidth(kHz)	Limit (kHz)	Result
1Mbps	00	636.00	≥500	Pass
	19	638.00		
	39	636.00		
2Mbps	00	1110.00	≥500	Pass
	19	1115.00		
	39	1115.00		

Test rate: 1Mbps

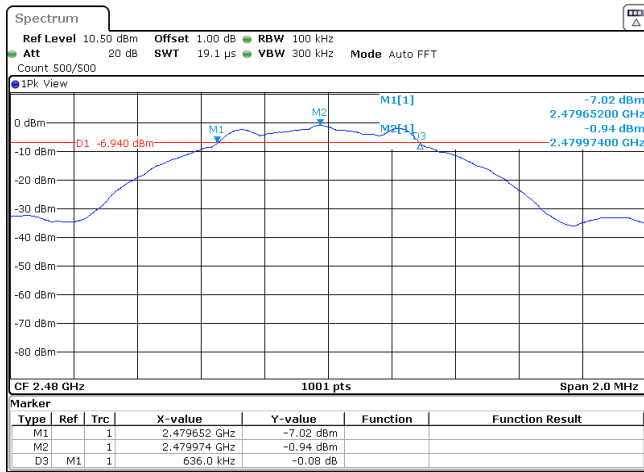
CH00



CH19

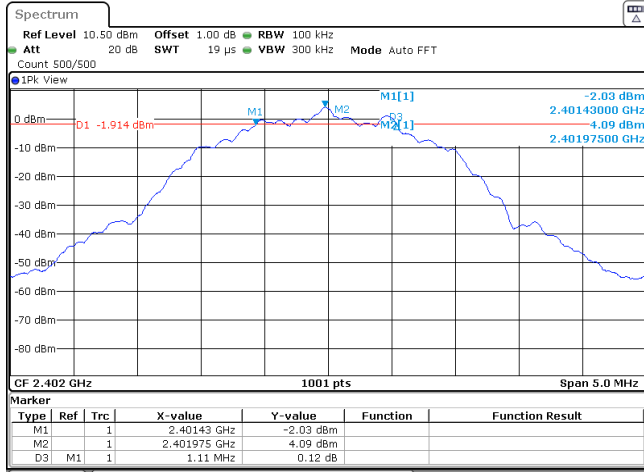


CH39



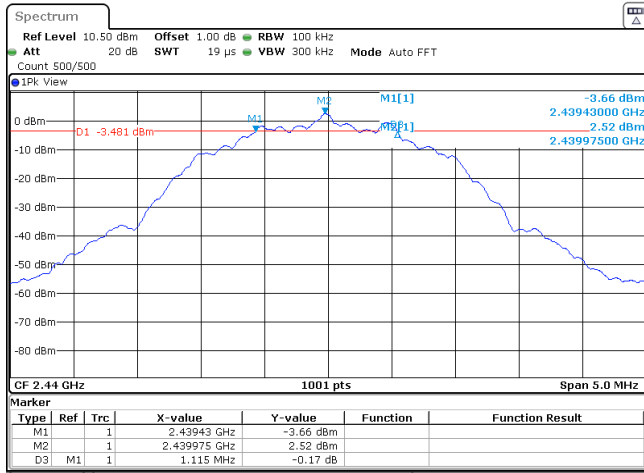
Test rate: 2Mbps

CH00



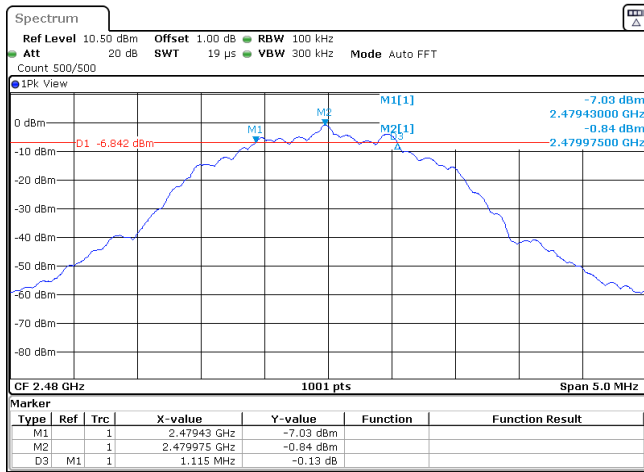
Date: 22 Jul 2023 10:44:08

CH19



Date: 22 Jul 2023 10:46:08

CH39



Date: 22 Jul 2023 10:48:14

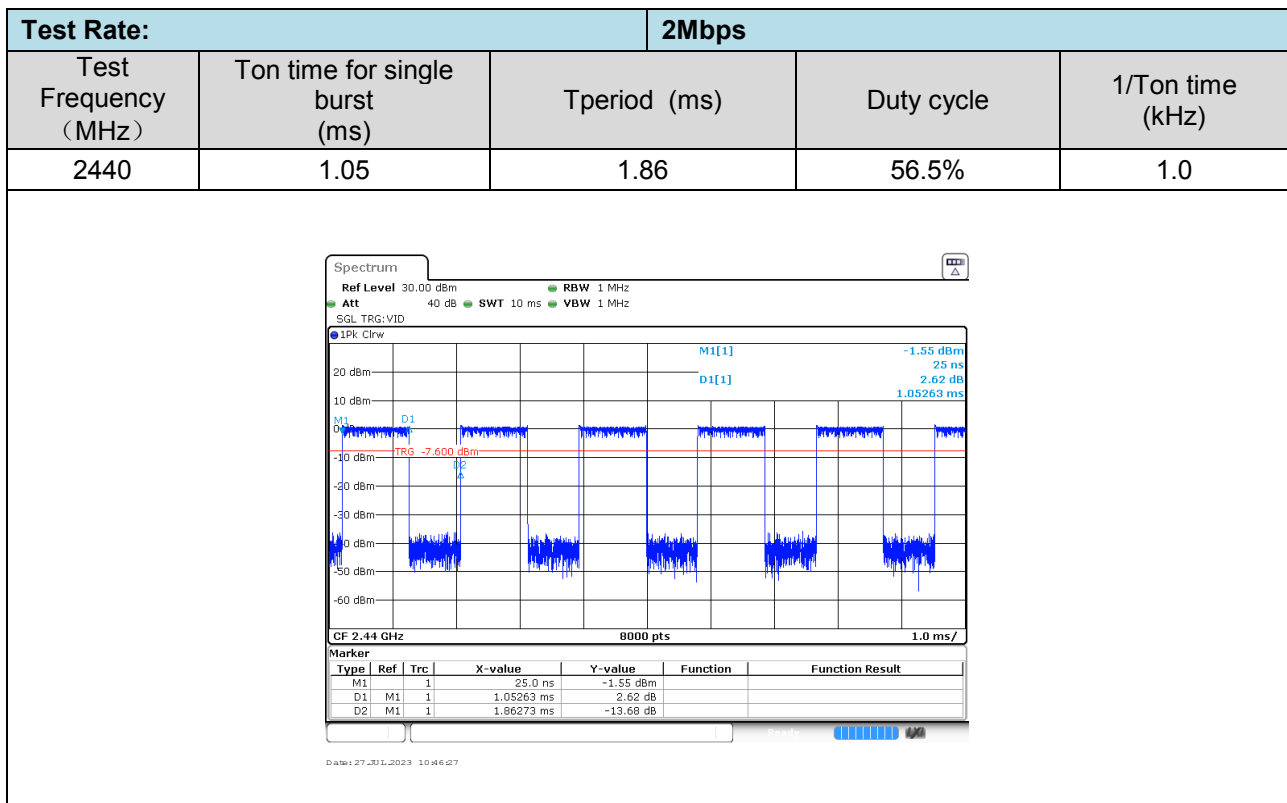
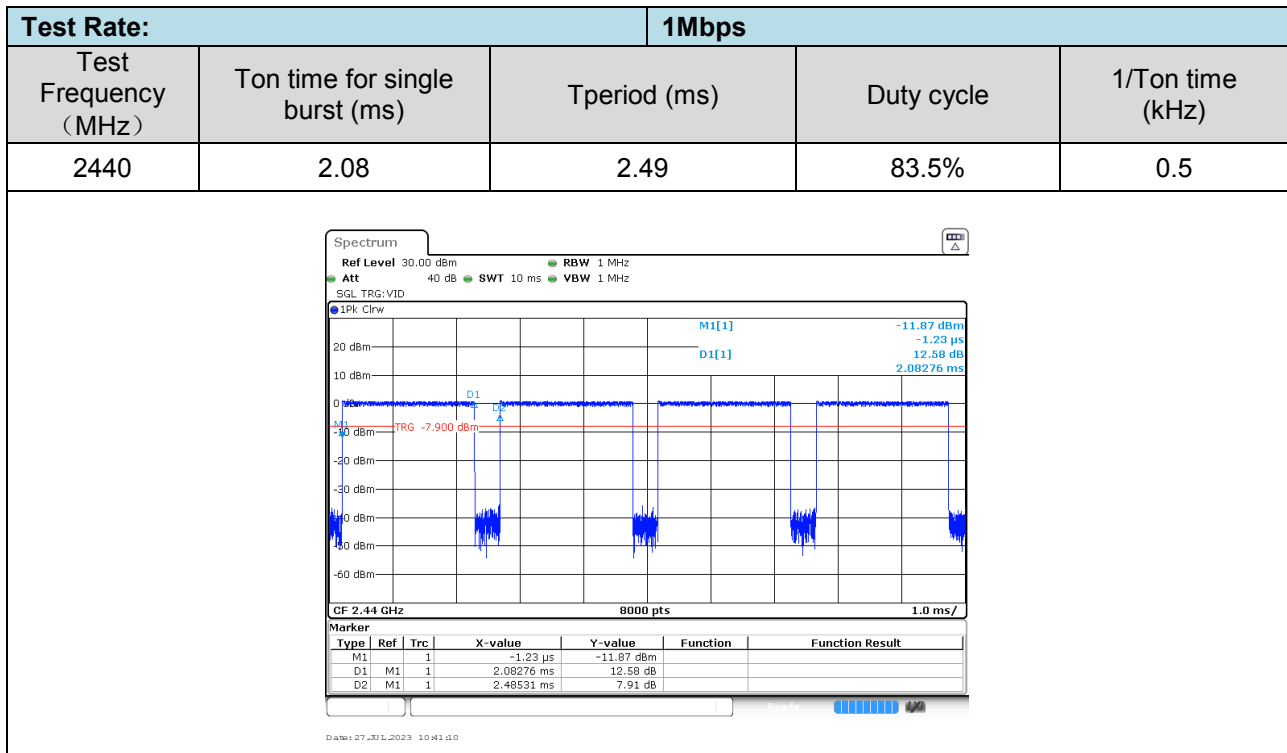
Appendix D: 99% Occupied Bandwidth

Test rate	Channel	99% Occupied Bandwidth(MHz)	Limit (kHz)	Result
1Mbps	00	1.02	-	Pass
	19	1.02		
	39	1.02		
2Mbps	00	2.02	-	Pass
	19	2.01		
	39	2.01		

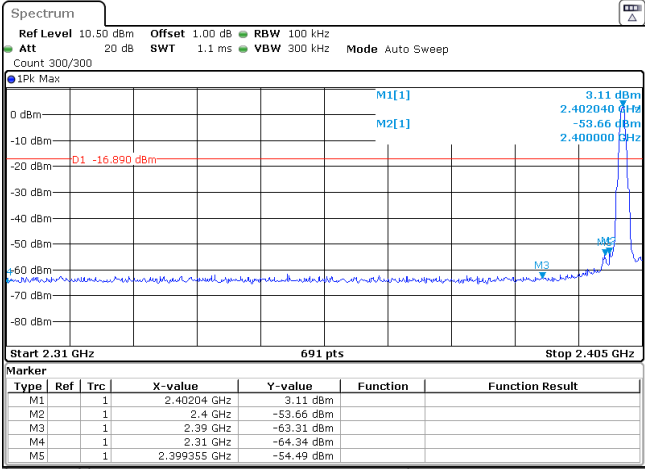
Test rate: 1Mbps	
CH00	<p>Spectrum Ref Level 10.50 dBm Offset 1.00 dB RBW 30 kHz Att 20 dB SWT 63.3 μs VBW 100 kHz Mode Auto FFT Count 500/500 IPk View M1 1.52 dBm 2.40197400 GHz 1.020979021 MHz Occ Bw T1 T2 CF 2.402 GHz 1001 pts Span 2.0 MHz</p>
CH19	<p>Spectrum Ref Level 10.50 dBm Offset 1.00 dB RBW 30 kHz Att 20 dB SWT 63.3 μs VBW 100 kHz Mode Auto FFT Count 500/500 IPk View M1[1] -0.21 dBm 2.43997400 GHz 1.020979021 MHz Occ Bw T1 T2 CF 2.44 GHz 1001 pts Span 2.0 MHz</p>
CH39	<p>Spectrum Ref Level 10.50 dBm Offset 1.00 dB RBW 30 kHz Att 20 dB SWT 63.3 μs VBW 100 kHz Mode Auto FFT Count 500/500 IPk View M1[1] -3.53 dBm 2.47997400 GHz 1.020979021 MHz Occ Bw T1 T2 CF 2.48 GHz 1001 pts Span 2.0 MHz</p>

Test rate: 2Mbps	
CH00	<p>Ref Level 10.50 dBm Offset 1.00 dB RBW 30 kHz Att 20 dB SWT 63.2 μs VBW 100 kHz Mode Auto FFT Count 500/500</p> <p>M1[1] 1.20 dBm 2.40198000 GHz Occ Bw 2.017982018 MHz</p> <p>CF 2.402 GHz 1001 pts Span 5.0 MHz</p>
CH19	<p>Ref Level 10.50 dBm Offset 1.00 dB RBW 30 kHz Att 20 dB SWT 63.2 μs VBW 100 kHz Mode Auto FFT Count 500/500</p> <p>M1[1] -0.35 dBm 2.43998000 GHz Occ Bw 2.012987013 MHz</p> <p>CF 2.44 GHz 1001 pts Span 5.0 MHz</p>
CH39	<p>Ref Level 10.50 dBm Offset 1.00 dB RBW 30 kHz Att 20 dB SWT 63.2 μs VBW 100 kHz Mode Auto FFT Count 500/500</p> <p>M1[1] -3.69 dBm 2.47998000 GHz Occ Bw 2.012987013 MHz</p> <p>CF 2.48 GHz 1001 pts Span 5.0 MHz</p>

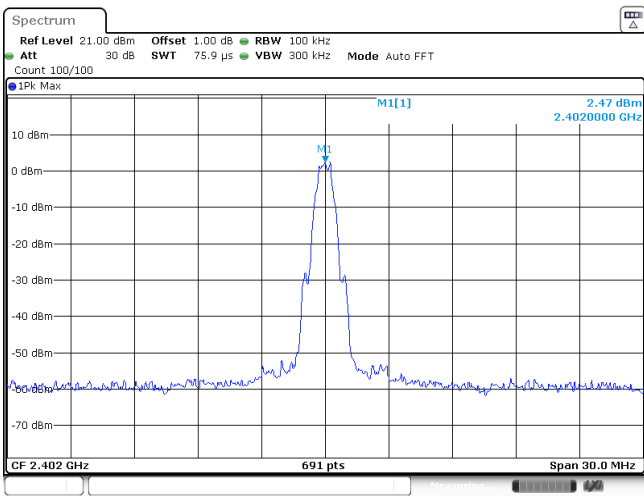
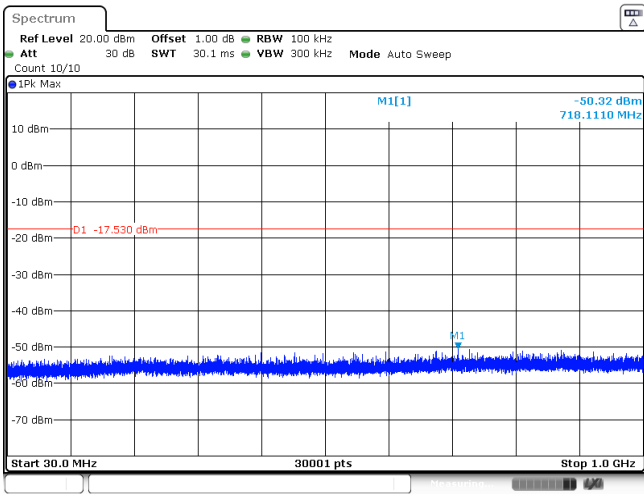
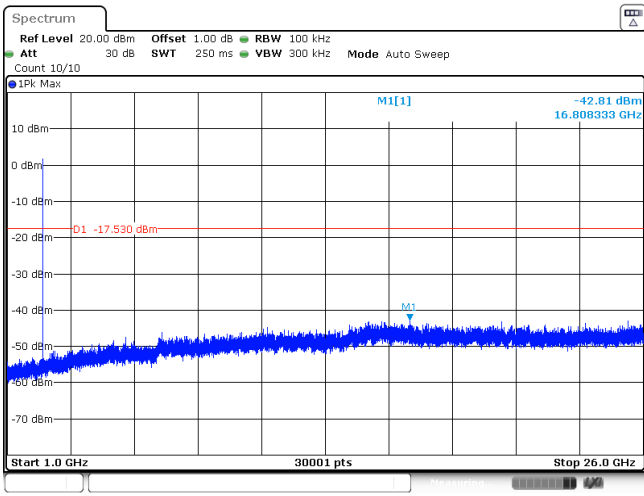
Appendix E: Duty cycle

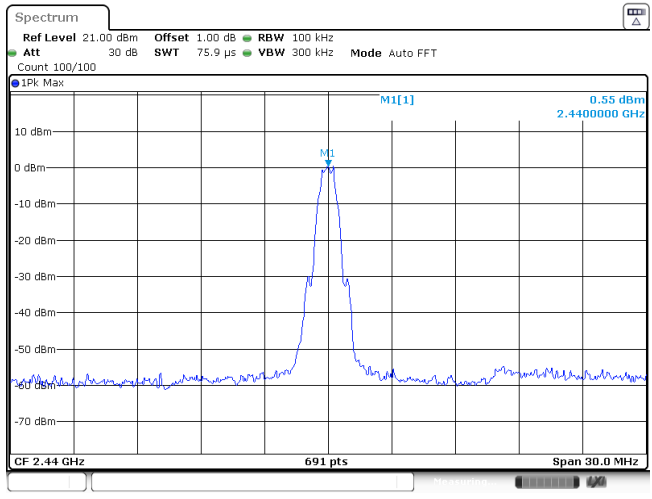
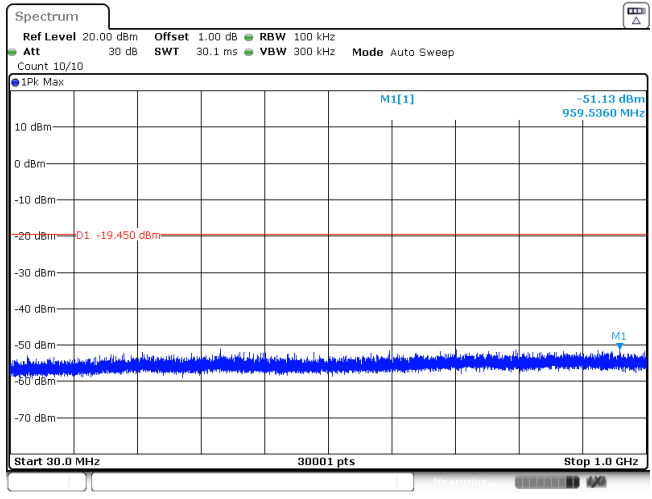
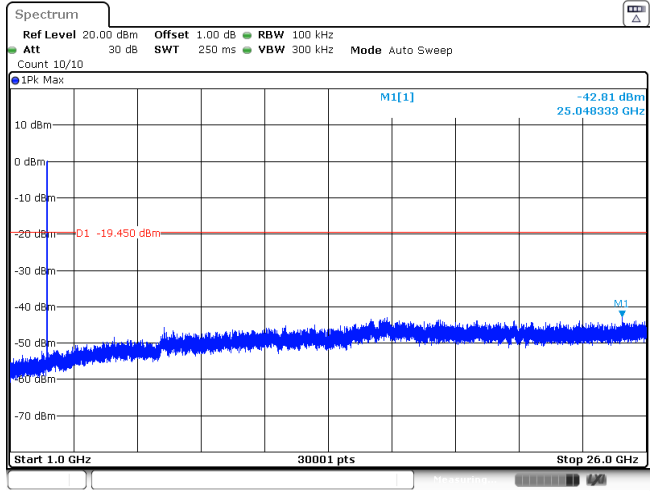


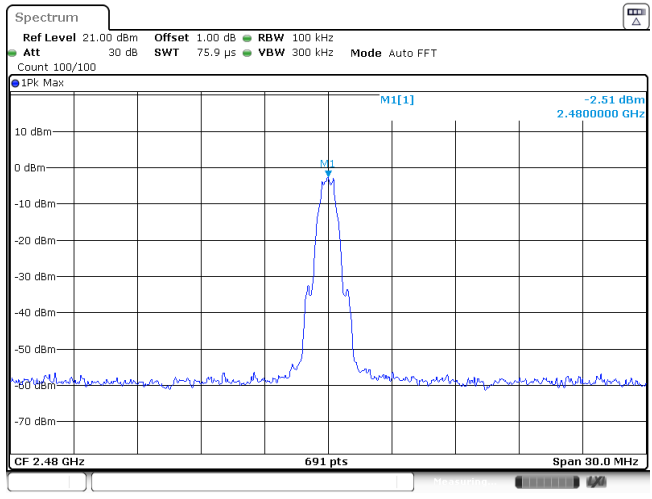
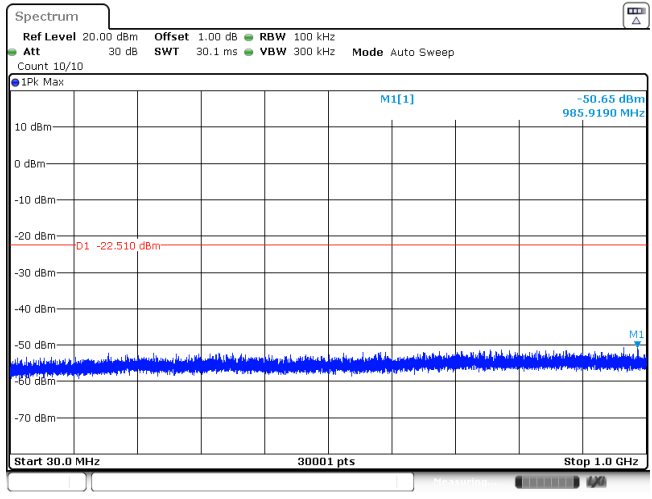
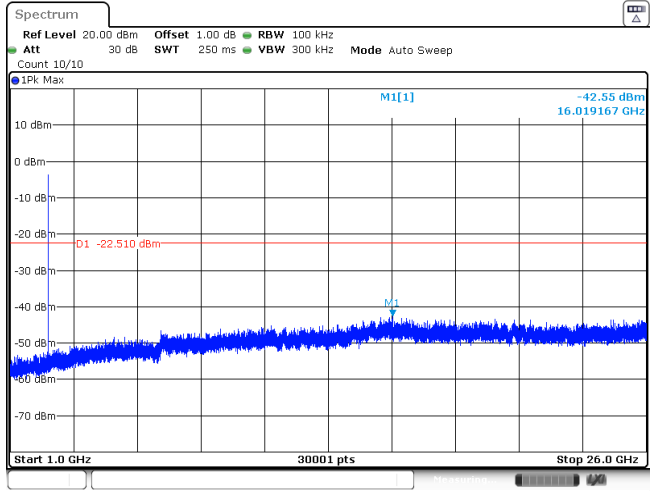
Appendix F: Band edge and Spurious Emissions (conducted)

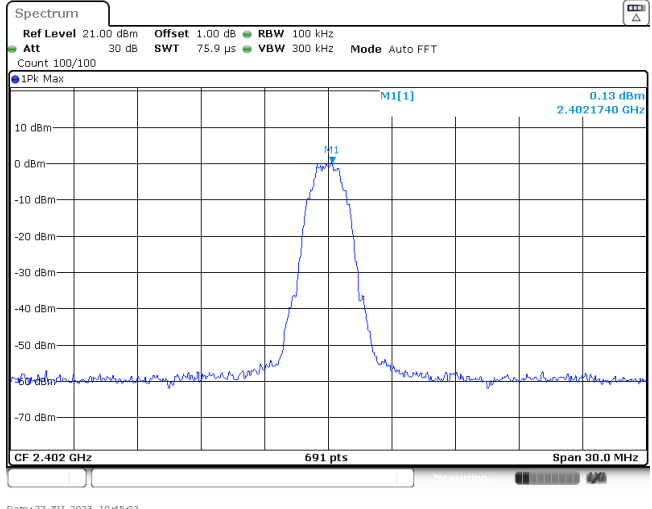
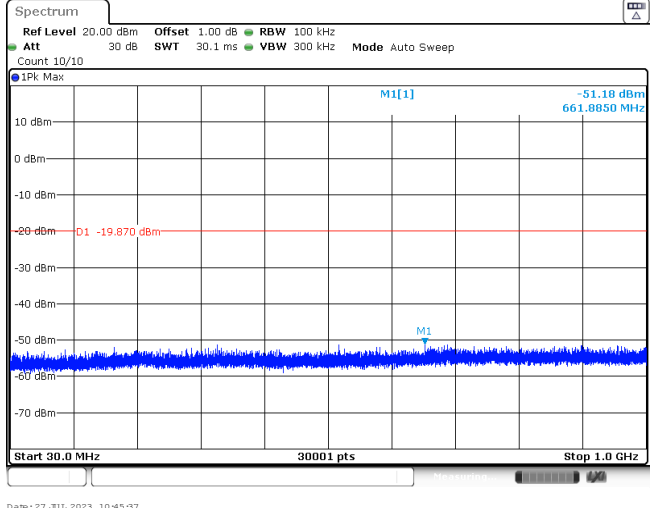
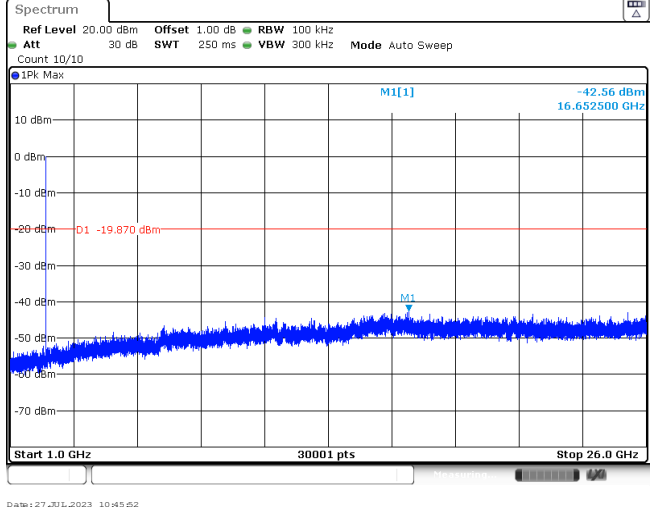
Test Item:	Band edge	Test Rate:	1Mbps																																										
CH00	 <p>Marker Table for CH00:</p> <table border="1"> <thead> <tr> <th>Type</th> <th>Ref</th> <th>Trc</th> <th>X-value</th> <th>Y-value</th> <th>Function</th> <th>Function Result</th> </tr> </thead> <tbody> <tr> <td>M1</td> <td>1</td> <td></td> <td>2.40204 GHz</td> <td>3.11 dBm</td> <td></td> <td></td> </tr> <tr> <td>M2</td> <td>1</td> <td></td> <td>2.4 GHz</td> <td>-53.66 dBm</td> <td></td> <td></td> </tr> <tr> <td>M3</td> <td>1</td> <td></td> <td>2.39 GHz</td> <td>-63.31 dBm</td> <td></td> <td></td> </tr> <tr> <td>M4</td> <td>1</td> <td></td> <td>2.31 GHz</td> <td>-64.34 dBm</td> <td></td> <td></td> </tr> <tr> <td>M5</td> <td>1</td> <td></td> <td>2.399355 GHz</td> <td>-54.49 dBm</td> <td></td> <td></td> </tr> </tbody> </table>			Type	Ref	Trc	X-value	Y-value	Function	Function Result	M1	1		2.40204 GHz	3.11 dBm			M2	1		2.4 GHz	-53.66 dBm			M3	1		2.39 GHz	-63.31 dBm			M4	1		2.31 GHz	-64.34 dBm			M5	1		2.399355 GHz	-54.49 dBm		
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M4	1		2.31 GHz	-64.34 dBm																																									
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CH39	 <p>Marker Table for CH39:</p> <table border="1"> <thead> <tr> <th>Type</th> <th>Ref</th> <th>Trc</th> <th>X-value</th> <th>Y-value</th> <th>Function</th> <th>Function Result</th> </tr> </thead> <tbody> <tr> <td>M1</td> <td>1</td> <td></td> <td>2.479958 GHz</td> <td>-1.26 dBm</td> <td></td> <td></td> </tr> <tr> <td>M2</td> <td>1</td> <td></td> <td>2.4835 GHz</td> <td>-64.62 dBm</td> <td></td> <td></td> </tr> <tr> <td>M3</td> <td>1</td> <td></td> <td>2.5 GHz</td> <td>-67.93 dBm</td> <td></td> <td></td> </tr> <tr> <td>M4</td> <td>1</td> <td></td> <td>2.4850145 GHz</td> <td>-63.35 dBm</td> <td></td> <td></td> </tr> </tbody> </table>			Type	Ref	Trc	X-value	Y-value	Function	Function Result	M1	1		2.479958 GHz	-1.26 dBm			M2	1		2.4835 GHz	-64.62 dBm			M3	1		2.5 GHz	-67.93 dBm			M4	1		2.4850145 GHz	-63.35 dBm									
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Test Item:	Band edge	Test Rate:	2Mbps																																										
CH00	 <p>Spectrum</p> <p>Ref Level 10.50 dBm Offset 1.00 dB RBW 100 kHz Att 20 dB SWT 1.1 ms VBW 300 kHz Mode Auto Sweep Count 300/300</p> <p>1PK Max</p> <table border="1"> <thead> <tr> <th>Type</th> <th>Ref</th> <th>Trc</th> <th>X-value</th> <th>Y-value</th> <th>Function</th> <th>Function Result</th> </tr> </thead> <tbody> <tr> <td>M1</td> <td>1</td> <td></td> <td>2.40204 GHz</td> <td>-3.54 dBm</td> <td></td> <td></td> </tr> <tr> <td>M2</td> <td>1</td> <td></td> <td>2.4 GHz</td> <td>-45.96 dBm</td> <td></td> <td></td> </tr> <tr> <td>M3</td> <td>1</td> <td></td> <td>2.39 GHz</td> <td>-64.41 dBm</td> <td></td> <td></td> </tr> <tr> <td>M4</td> <td>1</td> <td></td> <td>2.31 GHz</td> <td>-63.46 dBm</td> <td></td> <td></td> </tr> <tr> <td>M5</td> <td>1</td> <td></td> <td>2.399906 GHz</td> <td>-51.20 dBm</td> <td></td> <td></td> </tr> </tbody> </table> <p>Start 2.31 GHz 691 pts Stop 2.405 GHz</p>			Type	Ref	Trc	X-value	Y-value	Function	Function Result	M1	1		2.40204 GHz	-3.54 dBm			M2	1		2.4 GHz	-45.96 dBm			M3	1		2.39 GHz	-64.41 dBm			M4	1		2.31 GHz	-63.46 dBm			M5	1		2.399906 GHz	-51.20 dBm		
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M5	1		2.399906 GHz	-51.20 dBm																																									
CH39	 <p>Spectrum</p> <p>Ref Level 10.50 dBm Offset 1.00 dB RBW 100 kHz Att 20 dB SWT 56.9 μs VBW 300 kHz Mode Auto FFT Count 100/100</p> <p>1PK Max</p> <table border="1"> <thead> <tr> <th>Type</th> <th>Ref</th> <th>Trc</th> <th>X-value</th> <th>Y-value</th> <th>Function</th> <th>Function Result</th> </tr> </thead> <tbody> <tr> <td>M1</td> <td>1</td> <td></td> <td>2.479958 GHz</td> <td>-0.96 dBm</td> <td></td> <td></td> </tr> <tr> <td>M2</td> <td>1</td> <td></td> <td>2.4835 GHz</td> <td>-63.58 dBm</td> <td></td> <td></td> </tr> <tr> <td>M3</td> <td>1</td> <td></td> <td>2.5 GHz</td> <td>-68.32 dBm</td> <td></td> <td></td> </tr> <tr> <td>M4</td> <td>1</td> <td></td> <td>2.484313 GHz</td> <td>-62.80 dBm</td> <td></td> <td></td> </tr> </tbody> </table> <p>Start 2.478 GHz 691 pts Stop 2.5 GHz</p>			Type	Ref	Trc	X-value	Y-value	Function	Function Result	M1	1		2.479958 GHz	-0.96 dBm			M2	1		2.4835 GHz	-63.58 dBm			M3	1		2.5 GHz	-68.32 dBm			M4	1		2.484313 GHz	-62.80 dBm									
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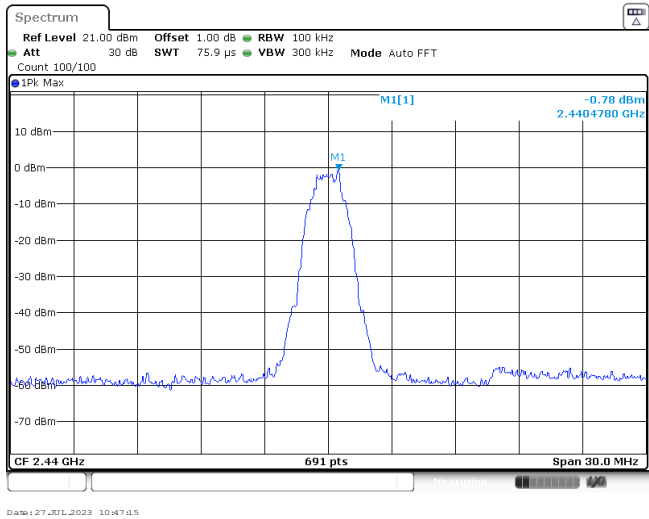
Test Item:	SE	Test Rate:	1Mbps
<p>CH00 Reference level</p>	 <p>Ref Level 21.00 dBm Offset 1.00 dB RBW 100 kHz Att 30 dB SWT 75.9 μs VBW 300 kHz Mode Auto FFT Count 100/100</p> <p>1Pk Max M1[1] 2.47 dBm 2.402000 GHz</p> <p>CF 2.402 GHz 691 pts Span 30.0 MHz</p> <p>Date: 27 JUL 2023 10:40:22</p>		
<p>CH00 30MHz~1000MHz</p>	 <p>Ref Level 20.00 dBm Offset 1.00 dB RBW 100 kHz Att 30 dB SWT 30.1 ms VBW 300 kHz Mode Auto Sweep Count 10/10</p> <p>1Pk Max M1[1] -50.32 dBm 718.1110 MHz</p> <p>D1 -17.530 dBm</p> <p>Start 30.0 MHz 30001 pts Stop 1.0 GHz</p> <p>Date: 27 JUL 2023 10:40:27</p>		
<p>CH00 1GHz~26GHz</p>	 <p>Ref Level 20.00 dBm Offset 1.00 dB RBW 100 kHz Att 30 dB SWT 250 ms VBW 300 kHz Mode Auto Sweep Count 10/10</p> <p>1Pk Max M1[1] -42.81 dBm 16.808333 GHz</p> <p>D1 -17.530 dBm</p> <p>Start 1.0 GHz 30001 pts Stop 26.0 GHz</p> <p>Date: 27 JUL 2023 10:40:27</p>		

<p>CH19 Reference level</p>	 <p>Spectrum Ref Level 21.00 dBm Offset 1.00 dB RBW 100 kHz Att 30 dB SWT 75.9 μs VBW 300 kHz Mode Auto FFT Count 100/100 IPK Max M1[1] 0.55 dBm 2.4400000 GHz CF 2.44 GHz 691 pts Span 30.0 MHz Date: 27 Jul 2023 10:41:67</p>
<p>CH19 30MHz~1000MHz</p>	 <p>Spectrum Ref Level 20.00 dBm Offset 1.00 dB RBW 100 kHz Att 30 dB SWT 30.1 ms VBW 300 kHz Mode Auto Sweep Count 10/10 IPK Max M1[1] -51.13 dBm 959.5360 MHz D1 -19.450 dBm Start 30.0 MHz 30001 pts Stop 1.0 GHz Date: 27 Jul 2023 10:42:02</p>
<p>CH19 1GHz~26GHz</p>	 <p>Spectrum Ref Level 20.00 dBm Offset 1.00 dB RBW 100 kHz Att 30 dB SWT 250 ms VBW 300 kHz Mode Auto Sweep Count 10/10 IPK Max M1[1] -42.81 dBm 25.046333 GHz D1 -19.450 dBm Start 1.0 GHz 30001 pts Stop 26.0 GHz Date: 27 Jul 2023 10:42:07</p>

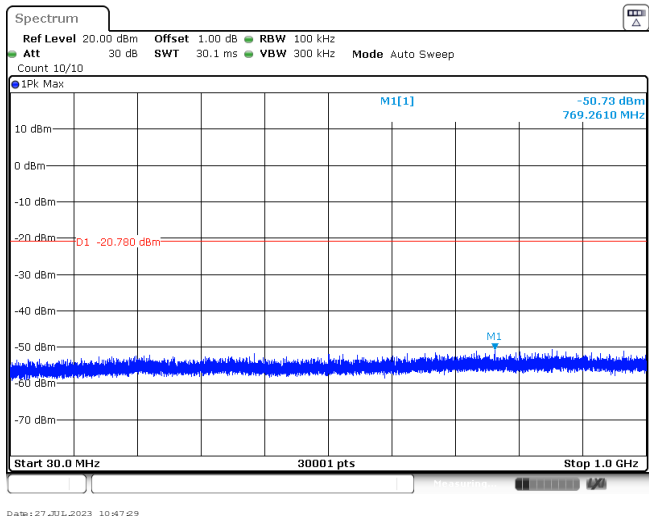
<p>CH39 Reference level</p>	 <p>Spectrum Ref Level 21.00 dBm Offset 1.00 dB RBW 100 kHz Att 30 dB SWT 75.9 μs VBW 300 kHz Mode Auto FFT Count 100/100 1PK Max M1[1] -2.51 dBm 2.480000 GHz CF 2.48 GHz 691 pts Span 30.0 MHz Date: 27 Jul 2023 10:43:08</p>
<p>CH39 30MHz~1000MHz</p>	 <p>Spectrum Ref Level 20.00 dBm Offset 1.00 dB RBW 100 kHz Att 30 dB SWT 30.1 ms VBW 300 kHz Mode Auto Sweep Count 10/10 1PK Max M1[1] -50.65 dBm 985.9190 MHz D1 -22.510 dBm Start 30.0 MHz 30001 pts Stop 1.0 GHz Date: 27 Jul 2023 10:43:52</p>
<p>CH39 1GHz~26GHz</p>	 <p>Spectrum Ref Level 20.00 dBm Offset 1.00 dB RBW 100 kHz Att 30 dB SWT 250 ms VBW 300 kHz Mode Auto Sweep Count 10/10 1PK Max M1[1] -42.55 dBm 16.019167 GHz D1 -22.510 dBm Start 1.0 GHz 30001 pts Stop 26.0 GHz Date: 27 Jul 2023 10:44:08</p>

Test Item:	SE	Test Rate:	2Mbps
<p>CH00 Reference level</p>	 <p>Spectrum</p> <p>Ref Level 21.00 dBm Offset 1.00 dB RBW 100 kHz Att 30 dB SWT 75.9 μs VBW 300 kHz Mode Auto FFT Count 100/100</p> <p>1Pk Max</p> <p>M1[1] 0.13 dBm 2.4021740 GHz</p> <p>CF 2.402 GHz 691 pts Span 30.0 MHz</p> <p>Date: 27 JUL 2023 10:45:22</p>		
<p>CH00 30MHz~1000MHz</p>	 <p>Spectrum</p> <p>Ref Level 20.00 dBm Offset 1.00 dB RBW 100 kHz Att 30 dB SWT 30.1 ms VBW 300 kHz Mode Auto Sweep Count 10/10</p> <p>1Pk Max</p> <p>M1[1] -51.18 dBm 661.8950 MHz</p> <p>D1 -19.870 dBm</p> <p>Start 30.0 MHz 30001 pts Stop 1.0 GHz</p> <p>Date: 27 JUL 2023 10:45:37</p>		
<p>CH00 1GHz~26GHz</p>	 <p>Spectrum</p> <p>Ref Level 20.00 dBm Offset 1.00 dB RBW 100 kHz Att 30 dB SWT 250 ms VBW 300 kHz Mode Auto Sweep Count 10/10</p> <p>1Pk Max</p> <p>M1[1] -42.56 dBm 16.652500 GHz</p> <p>D1 -19.870 dBm</p> <p>Start 1.0 GHz 30001 pts Stop 26.0 GHz</p> <p>Date: 27 JUL 2023 10:45:52</p>		

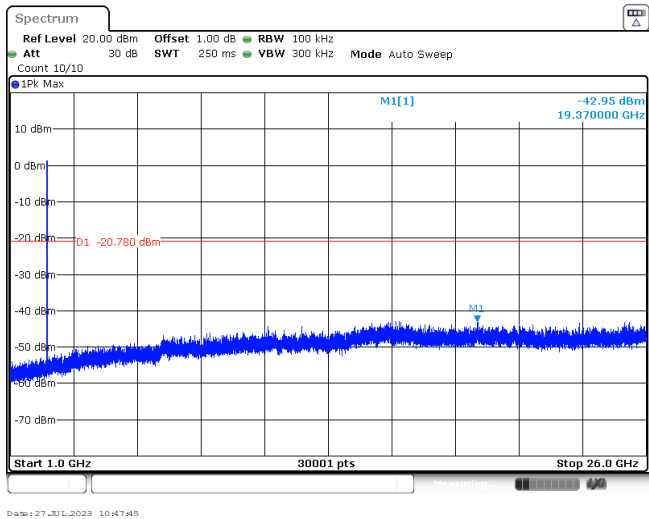
CH19
Reference level

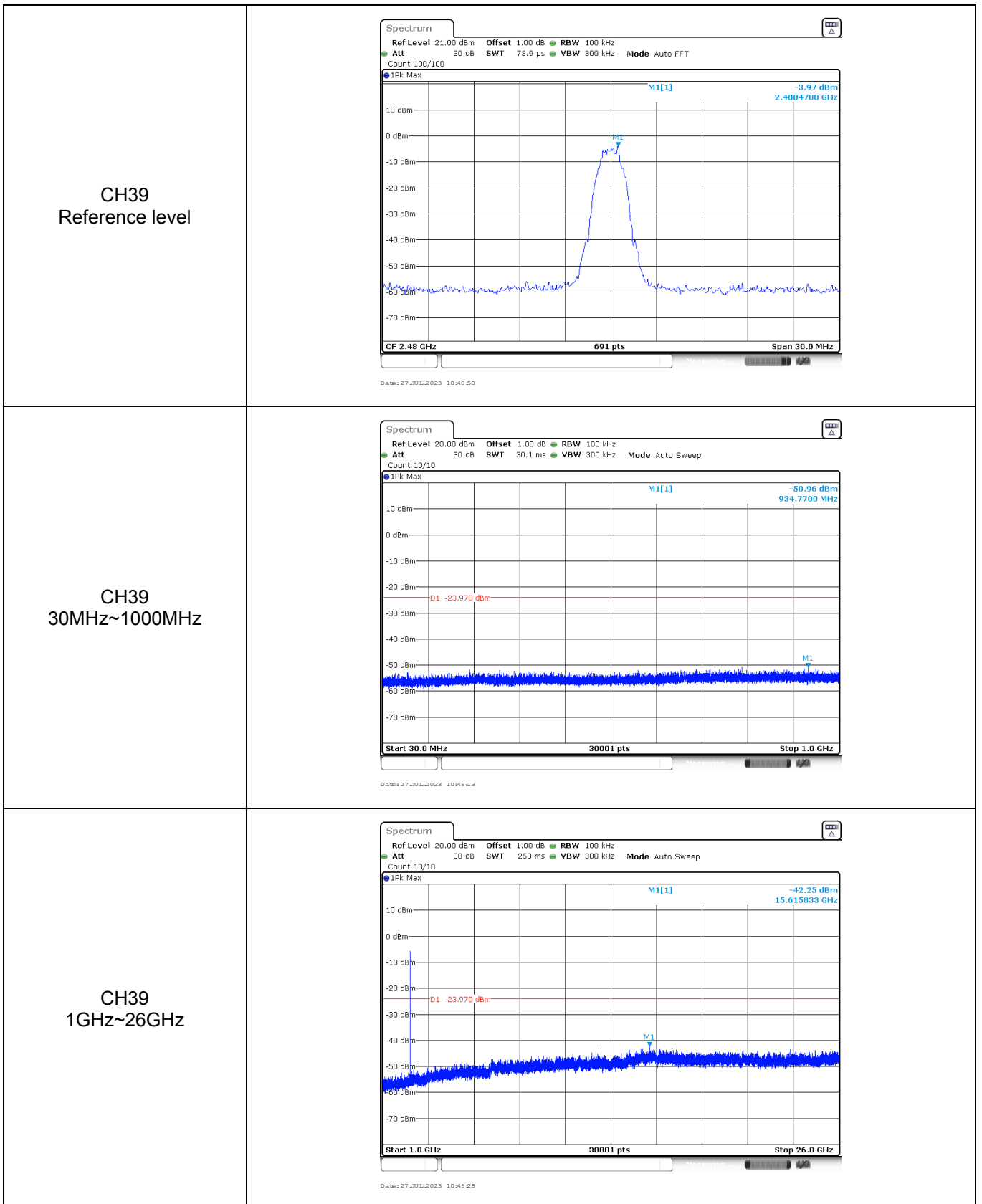


CH19
30MHz~1000MHz



CH19
1GHz~26GHz





-----End of Report-----