

TEST REPORT

REPORT NUMBER: I23W00054-BLE RF

ON

Type of Equipment: 5G CPE
Type of Designation: PW550, PW571, PW512, JW515, PW550-NA
Brand Name: ATEL
Manufacturer: Asiatelco Technologies Co.
FCC ID: XYO-PW550

ACCORDING TO

FCC Part 15

Chongqing Academy of Information and Communications Technology

Month date, year
Sep.26, 2023

Signature



Director

Note:

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of Chongqing Academy of Information and Communications Technology.



Report No.: I23W00054-BLE RF

Revision Version

Report Number	Revision	Date
I23IW00054-BLE RF	00	2023-09-26

Chongqing Academy of Information and Communication Technology

Address: No. 8,Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China,401336
Tel: 0086-23-88069965 FAX:0086-23-88608777

CONTENTS

1.	Test Laboratory.....	5
1.1.	Testing Location.....	5
1.2.	Testing Environment	5
1.3.	Project data	5
1.4.	Signature.....	5
2.	Client Information	6
2.1.	Applicant Information.....	6
2.2.	Manufacturer Information	6
3.	Equipment under Test (EUT) and Ancillary Equipment (AE)	7
3.1.	About EUT	7
3.2.	Internal Identification of EUT used during the test	7
3.3.	Outline of Equipment under Test	7
3.4.	Internal Identification of AE used during the test	7
3.5.	EUT Test RF Configuration	7
4.	Reference Documents	9
4.1.	Documents supplied by applicant.....	9
4.2.	Reference Documents for testing	9
5.	Test Equipments Utilized	10
5.1.	RF Test System	10
5.2.	RSE Test System	10
5.3.	Climate Chamber.....	10
5.4.	Anechoic chamber Vibration table.....	11
5.5.	Test software.....	11
6.	Test Results.....	12
6.1.	Summary of Test Results.....	12
6.2.	Peak Output Power-Conducted.....	13

Chongqing Academy of Information and Communication Technology

Address: No. 8,Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China,401336
Tel: 0086-23-88069965 FAX:0086-23-88608777



Report No.: I23W00054-BLE RF

6.3.	Peak Power Spectral Density	18
6.4.	6dB Bandwidth	23
6.5.	99% Occupied Bandwidth	28
6.6.	Frequency Band Edges-Conducted	33
6.7.	Conducted Emission	36
6.8.	Radiated Emission	47
6.9.	AC Powerline Conducted Emission	61
ANNEX A EUT Photos		64
ANNEX B Deviations from Prescribed Test Methods		65

Chongqing Academy of Information and Communication Technology

Address: No. 8, Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China, 401336
Tel: 0086-23-88069965 FAX: 0086-23-88608777

1. Test Laboratory

1.1. Testing Location

Name:	Chongqing Academy of Information and Communications Technology
Identifier Number:	CN0044
Designation Number:	CN1239
Address:	Building C, Technology Innovation Center, No.8, Yuma Road, Chayuan New Area, Nan'an District, Chongqing, People's Republic of China
Postal Code:	401336
Telephone:	0086-23-88069965
Fax:	0086-23-88608777

1.2. Testing Environment

Normal Temperature:	15-35°C
Relative Humidity:	25-75%

1.3. Project data

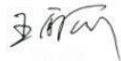
Testing Start Date:	2023-09-06
Testing End Date:	2023-09-13

1.4. Signature



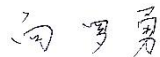
2023-09-26

Dong Junxin
(Prepared this test report)

Date

2023-09-26

Wang Lili
(Reviewed this test report)

Date

2023-09-26

Xiang Luoyong
Director of the laboratory
(Approved this test report)

Date

Chongqing Academy of Information and Communication Technology

Address: No. 8, Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China, 401336
Tel: 0086-23-88069965 FAX: 0086-23-88608777

2. Client Information

2.1. Applicant Information

Company Name:	Asiatelco Technologies Co.
Address /Post:	#68 HuaTuo Road, Building-8, Zhangjiang Hi-Tech Park, Pudong, Shanghai 201204, China
City:	Shanghai
Country:	China
Telephone:	N/A
Fax:	N/A
Email:	xsfbng@asiatelco.com
Contact Person:	xiaosheng.feng

2.2. Manufacturer Information

Company Name:	Asiatelco Technologies Co.
Address /Post:	#68 HuaTuo Road, Building-8, Zhangjiang Hi-Tech Park, Pudong, Shanghai 201204, China
City:	Shanghai
Country:	China
Telephone:	N/A
Fax:	N/A
Email:	xsfbng@asiatelco.com
Contact Person:	xiaosheng.feng

Chongqing Academy of Information and Communication Technology

Address: No. 8, Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China, 401336
Tel: 0086-23-88069965 FAX: 0086-23-88608777

3. Equipment under Test (EUT) and Ancillary Equipment (AE)

3.1. About EUT

EUT Description	5G CPE
Model name	PW550, PW571,PW512,JW515, PW550-NA
Brand name	ATEL
BLUETOOTH Frequency Band	2402MHz-2480MHz
Type of BLE modulation	GFSK

Note: Photographs of EUT are shown in ANNEX A of this test report.

Note: High and low voltage values in extreme condition test are given by manufacturer.

3.2. Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version	Date of receipt
S1	862424050114833	PW55-P1	CPE5_PW550_N0_00_v1.0.2	2023-09-05
S4	862424050061992	PW55-P1	CPE5_PW550_N0_00_v1.0.2	2023-09-06

*EUT ID: is used to identify the test sample in the lab internally.

Technology	Band	UL Freq.(MHz)	DL Freq.(MHz)	Note
BLE	CH0-39	2402-2480		--

3.3. Outline of Equipment under Test

3.4. Internal Identification of AE used during the test

AE ID*	Description	dB*
AE1	RF cable	1dB

*AE ID: is used to identify the test sample in the lab internally.

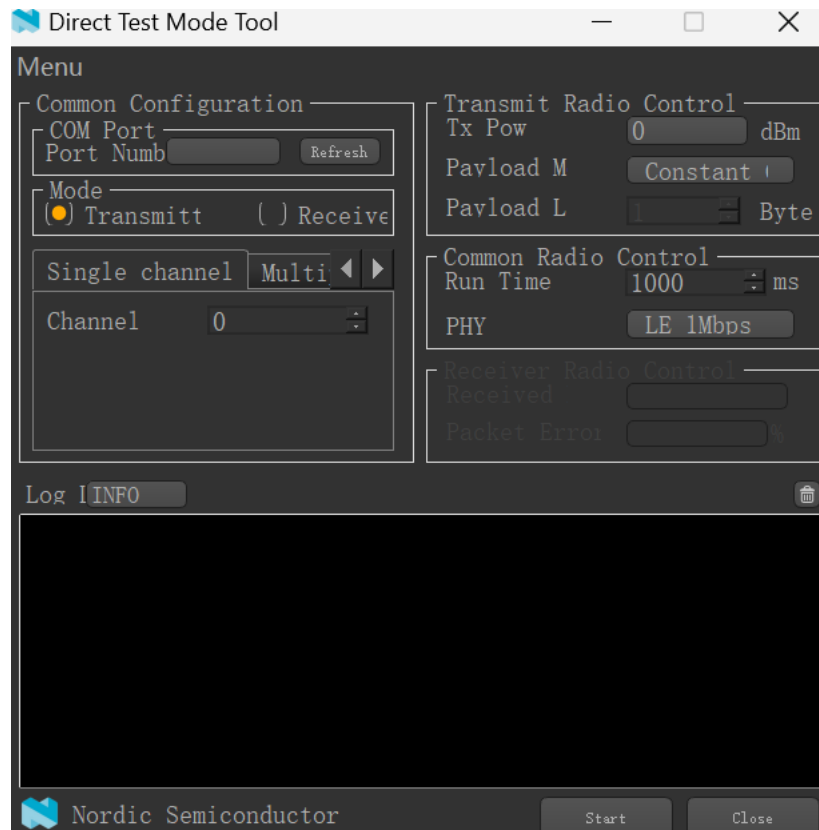
dB*: is provided customer.

3.5. EUT Test RF Configuration

EUT uses Direct Test Mode Tool working control emission measurement, Change power level, channel, rate and HT .

Chongqing Academy of Information and Communication Technology

Address: No. 8,Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China,401336
Tel: 0086-23-88069965 FAX:0086-23-88608777



4. Reference Documents

4.1. Documents supplied by applicant

PICS/PIXIT, referring to Annex B for detailed information, is supplied by the client or manufacturer, which is the basis of testing.

4.2. Reference Documents for testing

The following documents listed in this section are referred for testing.

Reference	Title	Version
FCC Part 15	FCC CFR 47, Part 15, Subpart C: 15.205 Restricted bands of operation; 15.209 Radiated emission limits, general requirements; 15.247 Operation within the bands 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz	--
ANSI C63.10	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices	2013
KDB 558074	Guidance for Performing Compliance Measurements on Frequency Hopping Spread Spectrum systems (DSS) Operating Under §15.247	2019
Note: KDB 558074 is not A2LA certified.		

Chongqing Academy of Information and Communication Technology

Address: No. 8, Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China, 401336
Tel: 0086-23-88069965 FAX: 0086-23-88608777

5. Test Equipments Utilized

5.1. RF Test System

No.	Equipment	Model	SN	HW Version	SW Version	Manufacture	Cal. Interval	Cal.Due Date
1	Spectrum analyzer	FSQ 26	201137/026	--	--	R&S	1 Year	2024-06-28
2	Spectrum analyzer	FSW26	104280	--	--	R&S	1 Year	2024-06-28
3	DC Power Supply	62015L-60-6	L02000001587	--	--	Chroma	1 Year	2024-06-28

5.2. RSE Test System

No.	Equipment	Model	SN	HW Version	SW Version	Manufacture	Cal. Interval	Cal.Due Date
1	EMI Test Receiver	ESU40	100307	--	--	R&S	1 Year	2024-06-28
2	TRILOG Broadband Antenna	VULB9163	9163-586	--	--	Schwarzbeck	1 Year	2023-10-29
								2024-10-28
3	Horn antenna	9120D	1083	--	--	Schwarzbeck	2 Year	2024-12-14
4	Horn antenna	DATE 1152	LM7127	--	--	ETS	2 Year	2024-09-06
5	Horn antenna	DATE 1012	LM5945	--	--	ETS	2 Year	2024-09-06
6	Amplifier1	SCU-08F1	8320027	--	--	R&S	1 Year	2024-06-28
7	Amplifier2	SCU-18F	180093	--	--	R&S	1 Year	2024-06-28
8	2-Line V-Network	ENV216	102368	--	--	R&S	1 Year	2024-05-27
9	Test Receiver	ESR 3	101382	03	3.48 SP2	R&S	1 Year	2024-01-28
10	Test Receiver	ESW 26	101382	00	1.50 SP1	R&S	1 Year	2024-06-28

5.3. Climate Chamber

No.	Name	Type	SN	Manufacture	Cal.Due Date
--	--	--	--	--	--

Chongqing Academy of Information and Communication Technology

Address: No. 8,Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China,401336
Tel: 0086-23-88069965 FAX:0086-23-88608777

5.4. Anechoic chamber Vibration table

No.	Name	Type	SN	Manufacture	Cal.Due Date
1	Fully-Anechoic Chamber	FAC 5	--	TDK	2024-09-22
2	Anechoic Chamber	SAC 10	--	TDK	2026-08-26

5.5. Test software

No.	Name	version	SN	Manufacture
1	EMC32 (Transmitter Spurious Emission-Radiated Above 1GHz)	V 10.20.01	--	R&S
2	EMC32 (Transmitter Spurious Emission-Radiated Below 1GHz)	V9.26.01	--	R&S
3	EMC32 (AC Powerline Conducted Emission)	V 10.40.10	--	R&S

Chongqing Academy of Information and Communication Technology

Address: No. 8,Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China,401336
Tel: 0086-23-88069965 FAX:0086-23-88608777

6. Test Results

6.1. Summary of Test Results

FCC Rules	Name of Test	Result
15.247(b)	Maximum Peak Output Power	Pass
15.247(e)	Peak Power Spectral Density	Pass
15.247(a)	6dB Occupied Bandwidth	Pass
15.247(a)	99% Occupied Bandwidth	Pass
15.247(d)	Band Edges Compliance	Pass
15.247(d)	Transmitter Spurious Emission-Conducted	Pass
15.247/15.205/15.209	Transmitter Spurious Emission-Radiated	Pass
15.207	AC Powerline Conducted Emission	Pass
NOTE: The PW550, PW571, PW512, JW515, PW550-NA, manufactured by Asiatelco Technologies Co. is a new product for testing.		

6.2. Peak Output Power-Conducted

Specifications:	FCC 47 Part 15.247(b)
DUT Serial Number:	S4
Test conditions:	Ambient Temperature:15°C-35°C Relative Humidity:30%-60% Air pressure: 86-106kPa
Test Results:	Pass

Limit Level Construction:

Standard	Conducted Limit(dBm)	EIRP Limit(dBm)
FCC 47 Part 15.247(b)	<30	<36

Measurement Uncertainty:

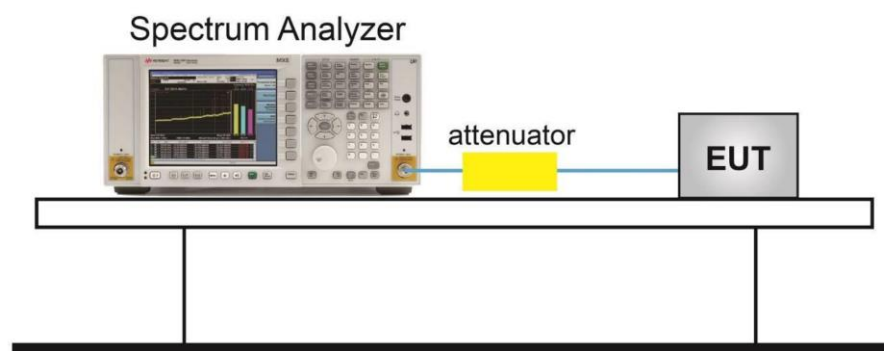
Measurement Uncertainty	±0.46dBm
-------------------------	----------

Test Procedure:

The measurement is according to ANSI C63.10 clause 11.9.1

1. Set the RBW $\geq$ DTS bandwidth.
2. Set VBW $\geq$ $[3 \times \text{RBW}]$.
3. Set span $\geq$ $[3 \times \text{RBW}]$.
4. Sweep time = auto couple.
5. Detector = peak.
6. Trace mode = max hold.
7. Allow trace to fully stabilize.
8. Use peak marker function to determine the peak amplitude level.

Test setup:



Chongqing Academy of Information and Communication Technology

Address: No. 8,Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China,401336
Tel: 0086-23-88069965 FAX:0086-23-88608777

Antenna gain of EUT:

No.	Item(s)	Data
1	Antenna gain of EUT	3.87 dBi
Note: The data of antenna gain is based on BT antenna datasheet provided by the manufacturer.		

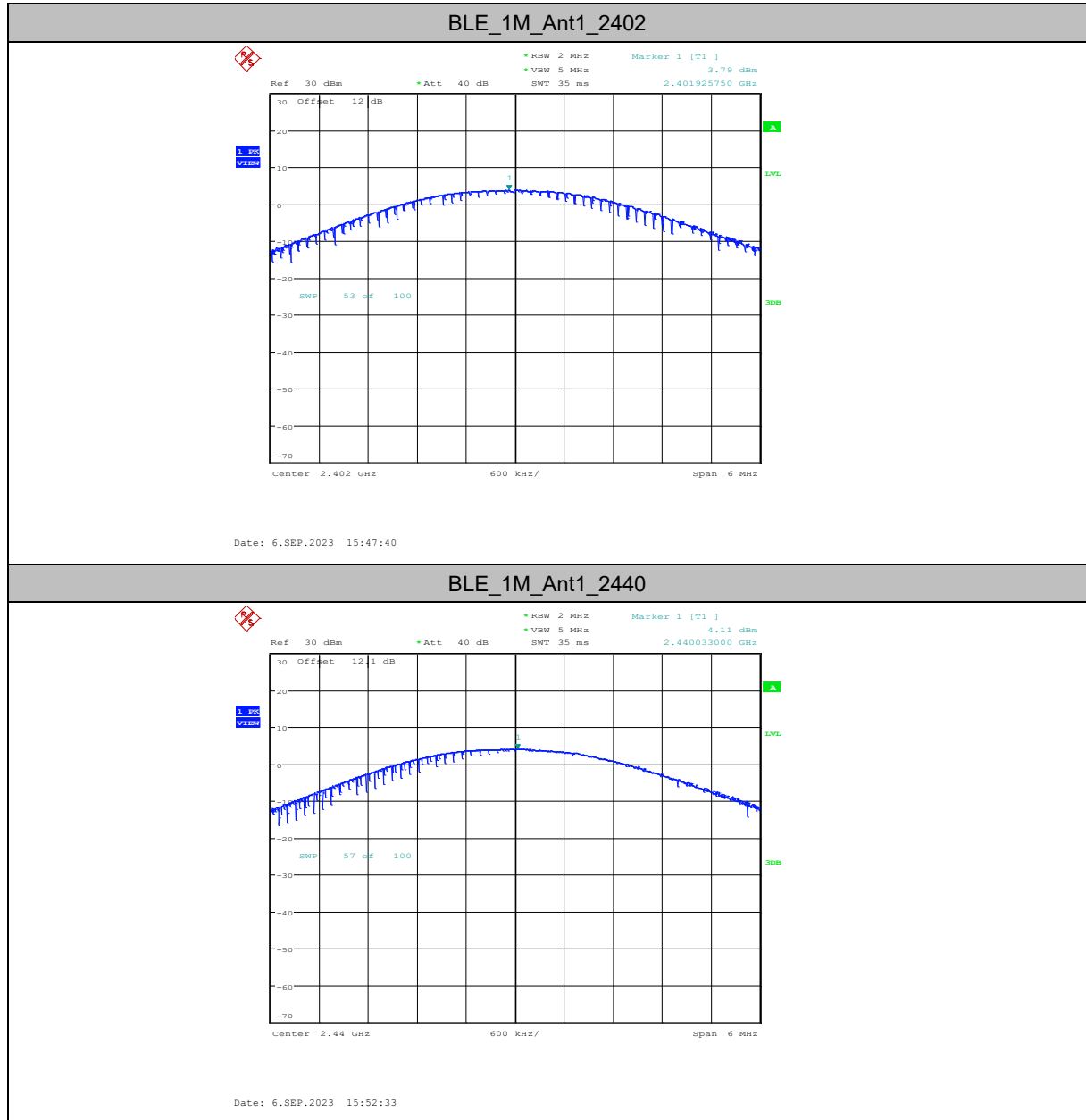
Measurement Results:

TestMode	Antenna	Frequency[MHz]	Conducted Peak Power [dBm]	Conducted Limit [dBm]	EIRP [dBm]	EIRP Limit [dBm]	Verdict
BLE_1M	Ant1	2402	3.79	≤30	7.66	≤36	PASS
		2440	4.11	≤30	7.98	≤36	PASS
		2480	3.98	≤30	7.85	≤36	PASS
BLE_2M	Ant1	2402	3.83	≤30	7.7	≤36	PASS
		2440	4.22	≤30	8.09	≤36	PASS
		2480	4	≤30	7.87	≤36	PASS

Chongqing Academy of Information and Communication Technology

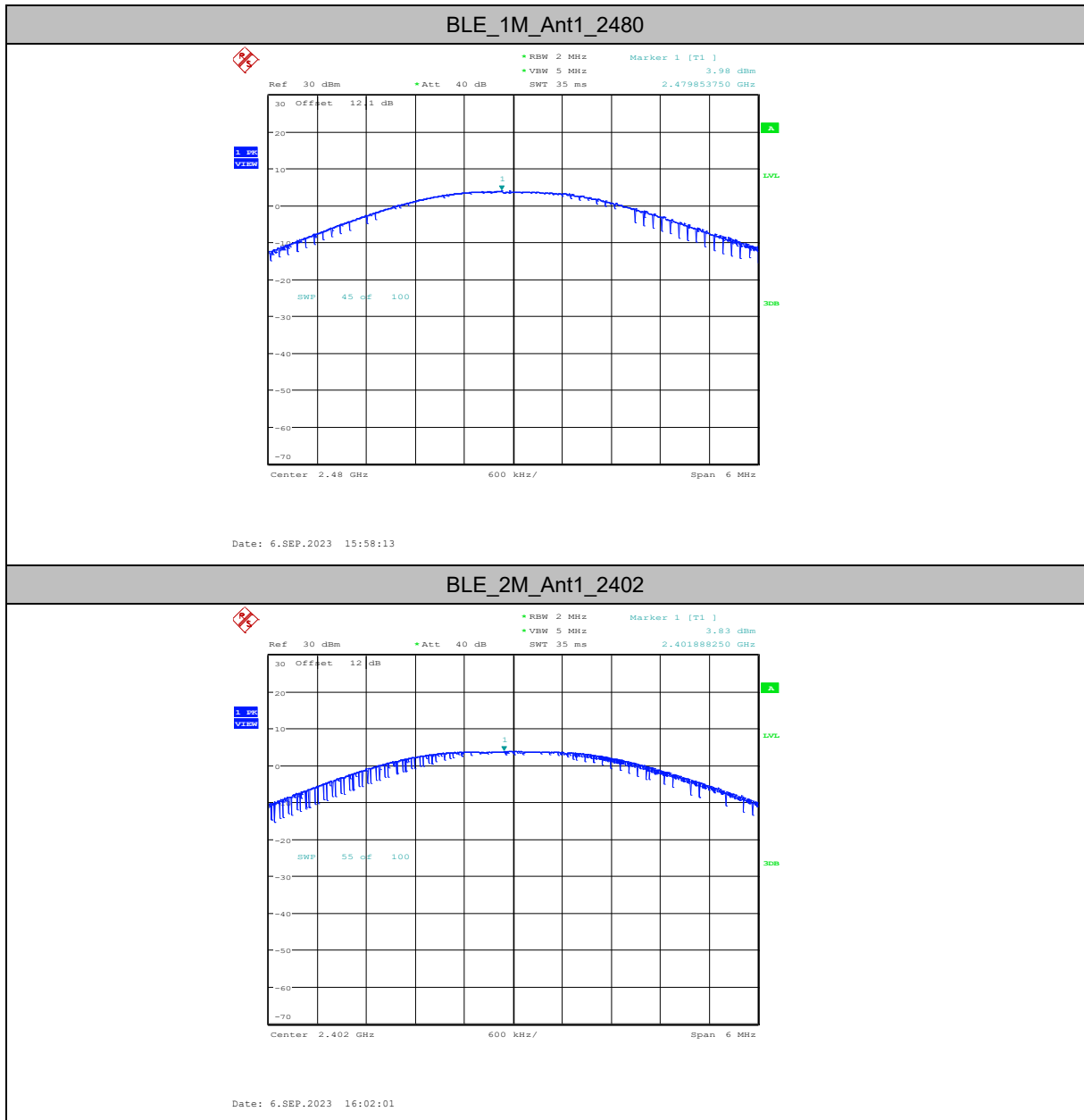
Address: No. 8, Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China, 401336
Tel: 0086-23-88069965 FAX: 0086-23-88608777

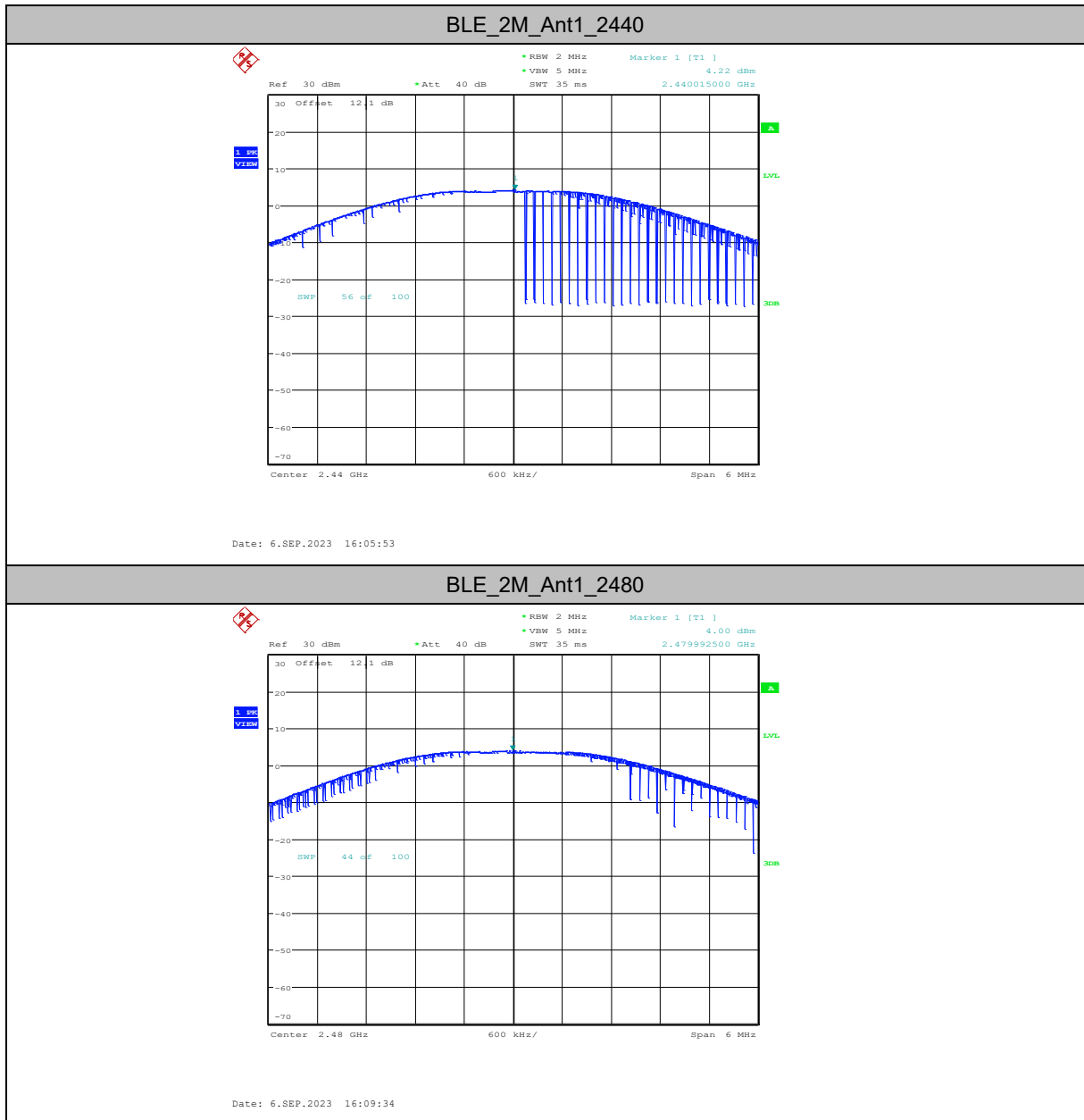
Test graphs as below



Chongqing Academy of Information and Communication Technology

Address: No. 8,Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China,401336
Tel: 0086-23-88069965 FAX:0086-23-88608777





6.3. Peak Power Spectral Density

Specifications:	FCC 47 Part 15.247(e)
DUT Serial Number:	S4
Test conditions:	Ambient Temperature:15°C-35°C Relative Humidity:30%-60% Air pressure: 86-106kPa
Test Results:	Pass

Limit Level Construction:

Standard	Limit
FCC 47 Part 15.247(e)	$\leq 8\text{dBm}/3\text{ kHz}$

Measurement Uncertainty:

Measurement Uncertainty	$\pm 0.56\text{dB}$
-------------------------	---------------------

Test procedures:

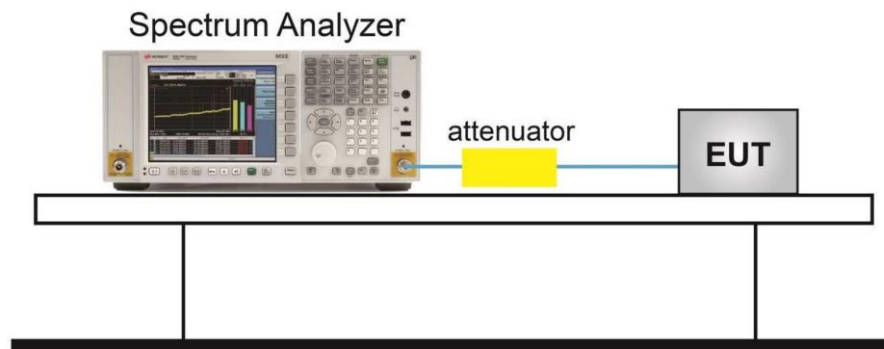
The measurement is according to ANSI C63.10 clause 11.10.

1. The output power of EUT was connected to the spectrum analyzer. The path loss was compensated to the results for each measurement.
2. Enable EUT transmitter maximum power continuously.
3. Set analyzer center frequency to DTS channel center frequency.
4. Set the span to 1.5 times the DTS bandwidth.
5. Set the RBW to $3\text{ kHz} \leq \text{RBW} \leq 100\text{ kHz}$.
6. Set the VBW $\geq [3 \times \text{RBW}]$.
7. Detector = peak.
8. Sweep time = auto couple.
9. Trace mode = max hold.
10. Allow trace to fully stabilize.
11. Use the peak marker function to determine the maximum amplitude level within the RBW.
12. If measured value exceeds requirement, then reduce RBW (but no less than 3 kHz) and repeat.

Chongqing Academy of Information and Communication Technology

Address: No. 8, Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China, 401336
Tel: 0086-23-88069965 FAX: 0086-23-88608777

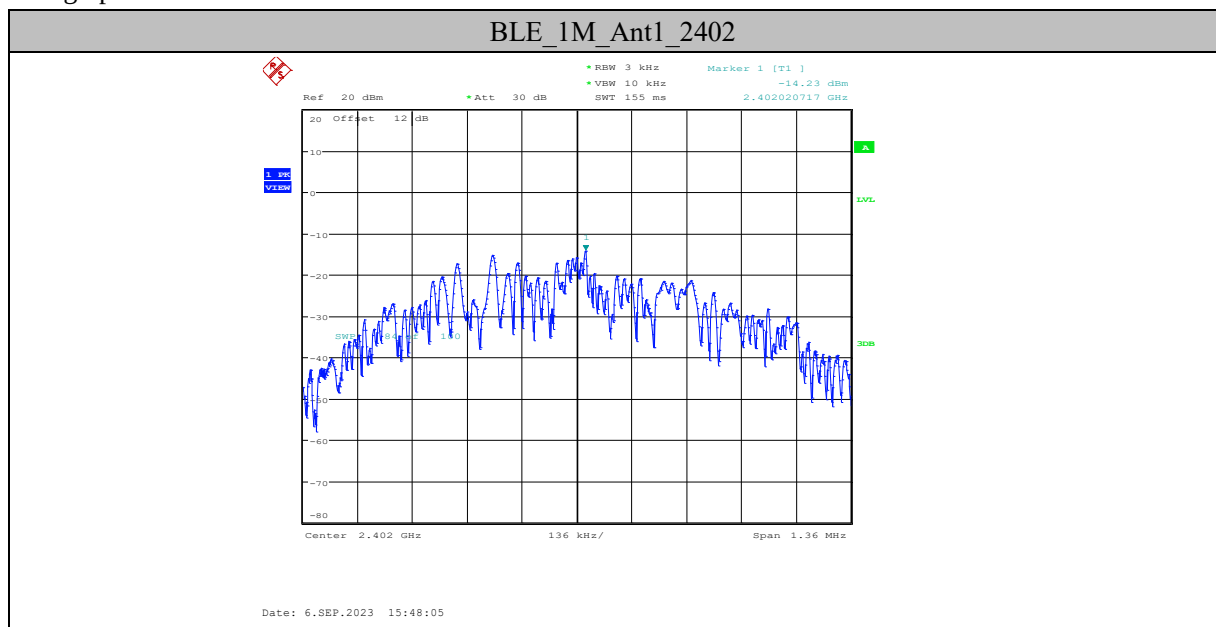
Test Setup



Measurement Results:

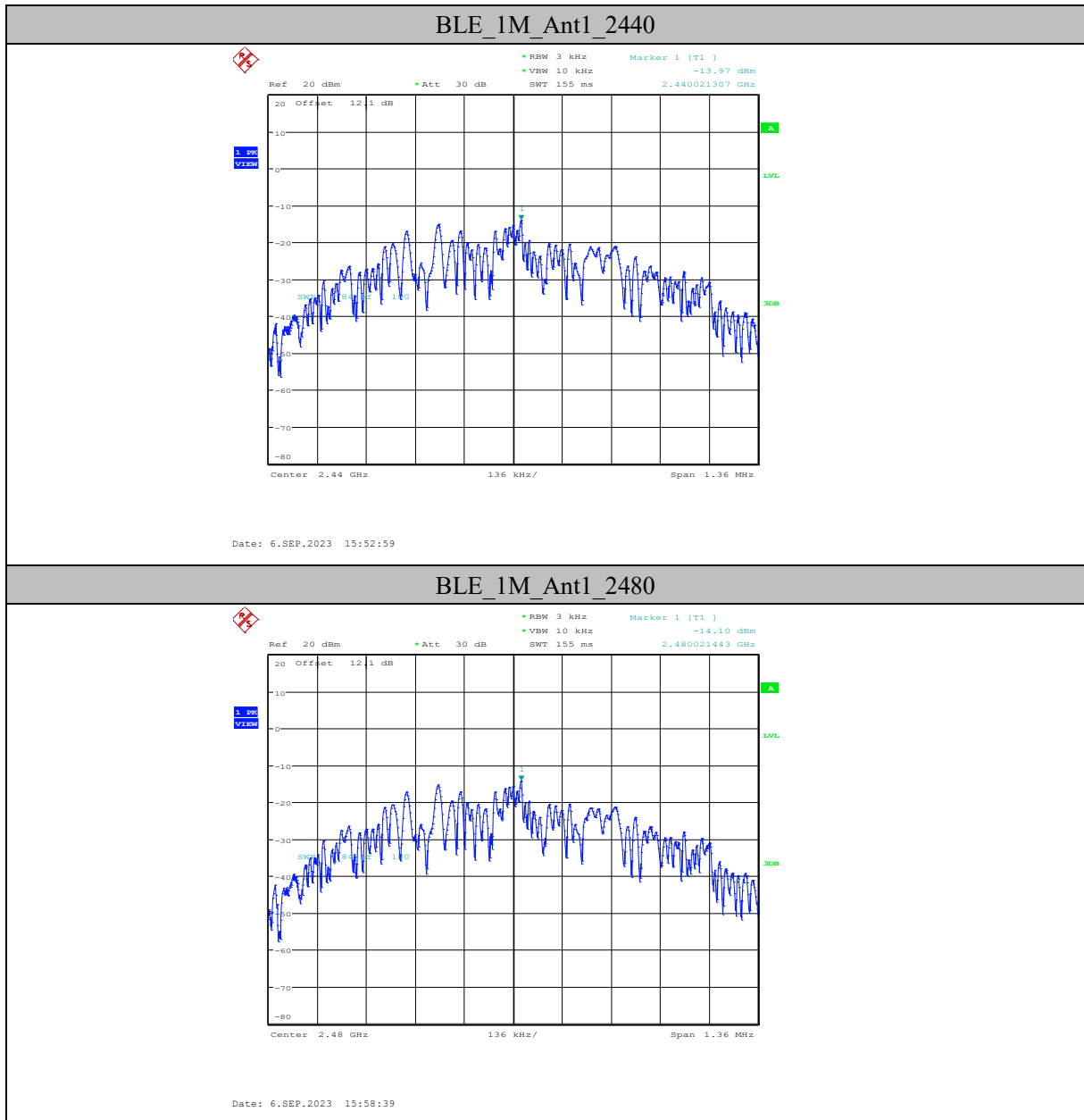
TestMode	Antenna	Frequency[MHz]	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
BLE_1M	Ant1	2402	-14.23	≤8.00	PASS
		2440	-13.97	≤8.00	PASS
		2480	-14.1	≤8.00	PASS
BLE_2M	Ant1	2402	-16.29	≤8.00	PASS
		2440	-16.06	≤8.00	PASS
		2480	-16.18	≤8.00	PASS

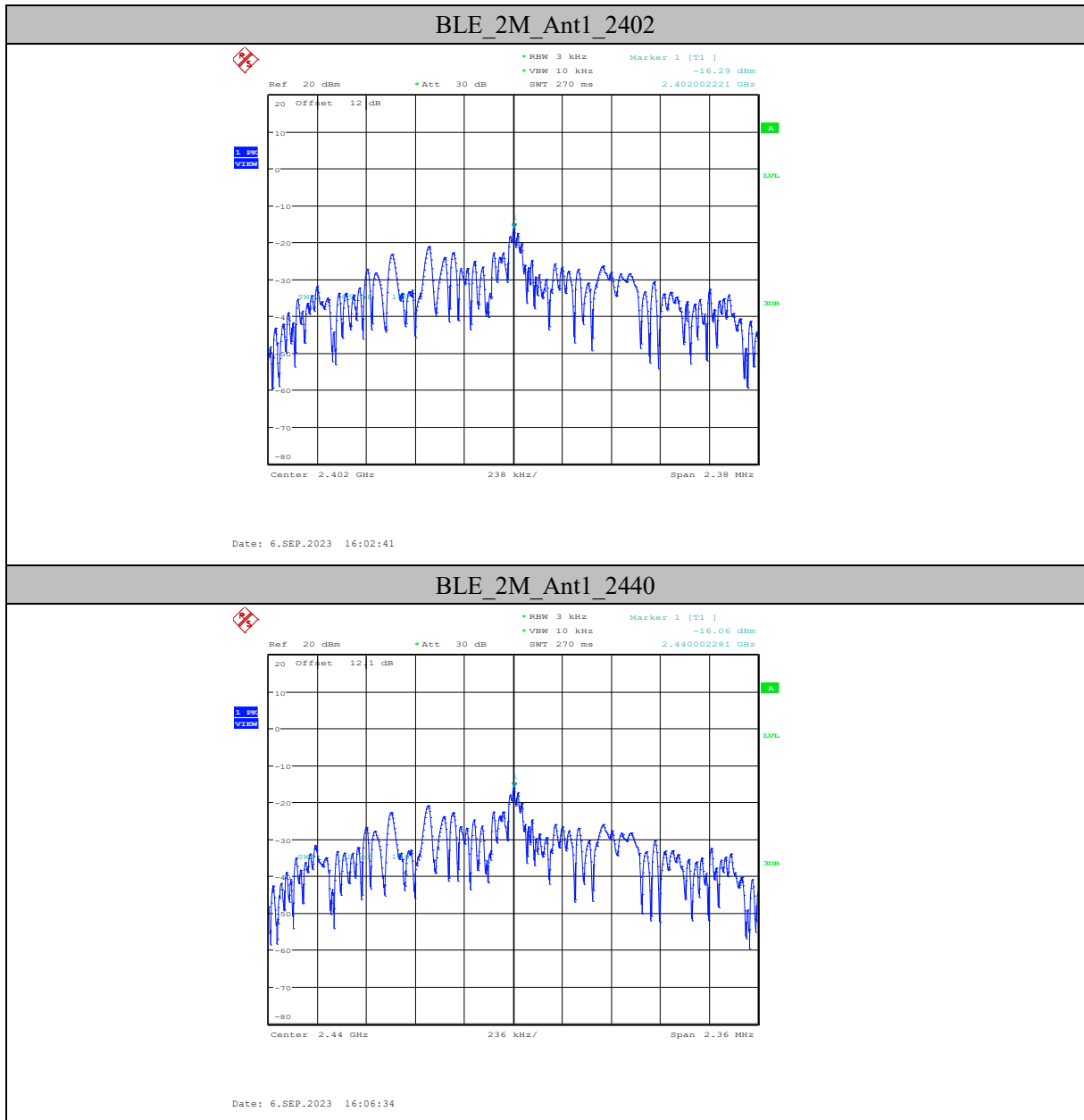
Test graphs as below

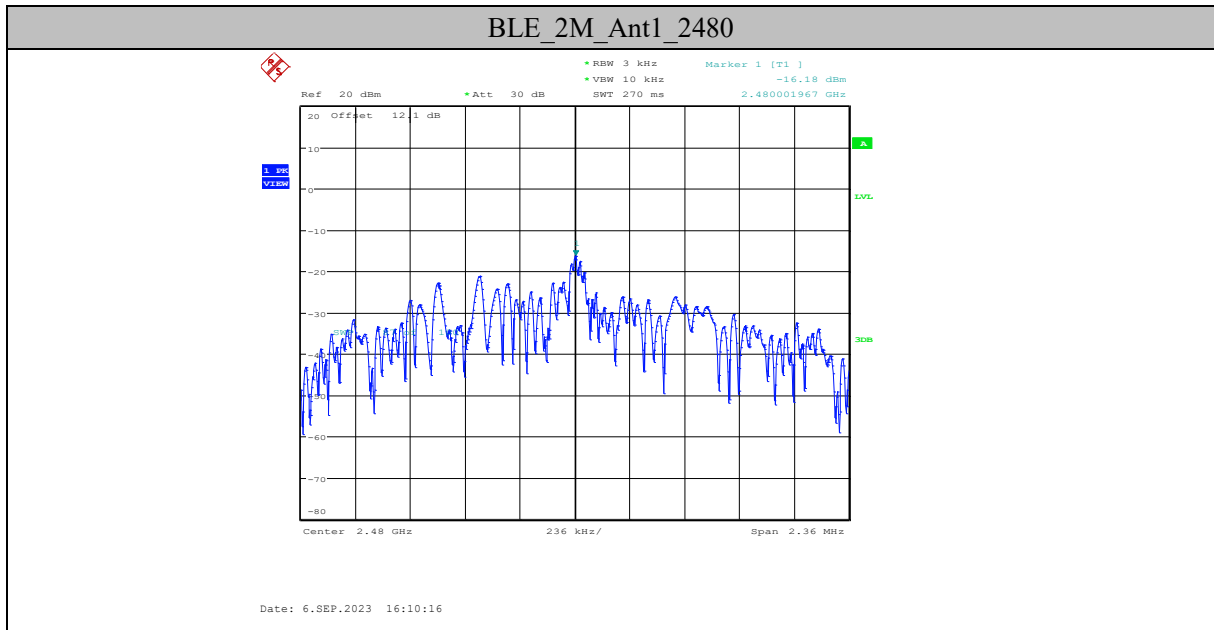


Chongqing Academy of Information and Communication Technology

Address: No. 8,Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China,401336
Tel: 0086-23-88069965 FAX:0086-23-88608777







Chongqing Academy of Information and Communication Technology

Address: No. 8, Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China, 401336
 Tel: 0086-23-88069965 FAX: 0086-23-88608777

6.4. 6dB Bandwidth

Specifications:	FCC 47 Part 15.247 (a) (2)
DUT Serial Number:	S4
Test conditions:	Ambient Temperature:15°C-35°C Relative Humidity:30%-60% Air pressure: 86-106kPa
Test Results:	Pass

Limit Level Construction:

Standard	Limit
FCC 47 Part 15.247 (a) (2)	$\geq 500\text{kHz}$

Measurement Uncertainty:

Measurement Uncertainty	$\pm 0.72\text{KHz}$
-------------------------	----------------------

Test procedures:

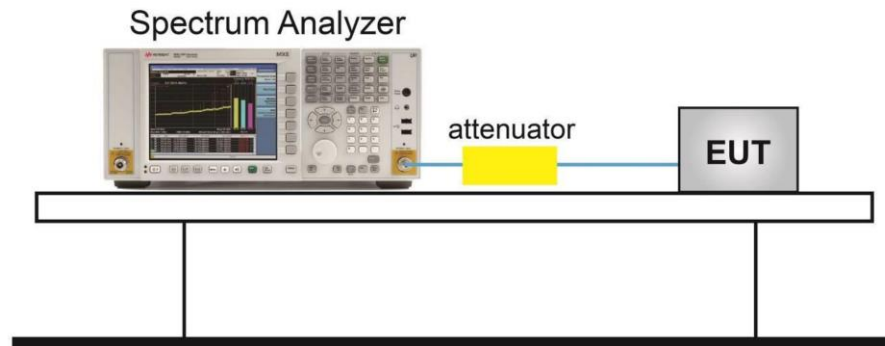
The measurement is according to ANSI C63.10 clause 11.8.

1. The output power of EUT was connected to the spectrum analyzer. The path loss was compensated to the results for each measurement.
2. Enable EUT transmitter maximum power continuously.
3. Set RBW = 100 kHz.
4. Set the VBW $\geq [3 \times \text{RBW}]$.
5. Detector = peak.
6. Trace mode = max hold.
7. Sweep = auto couple.
8. Allow the trace to stabilize.
9. 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.

Chongqing Academy of Information and Communication Technology

Address: No. 8, Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China, 401336
Tel: 0086-23-88069965 FAX: 0086-23-88608777

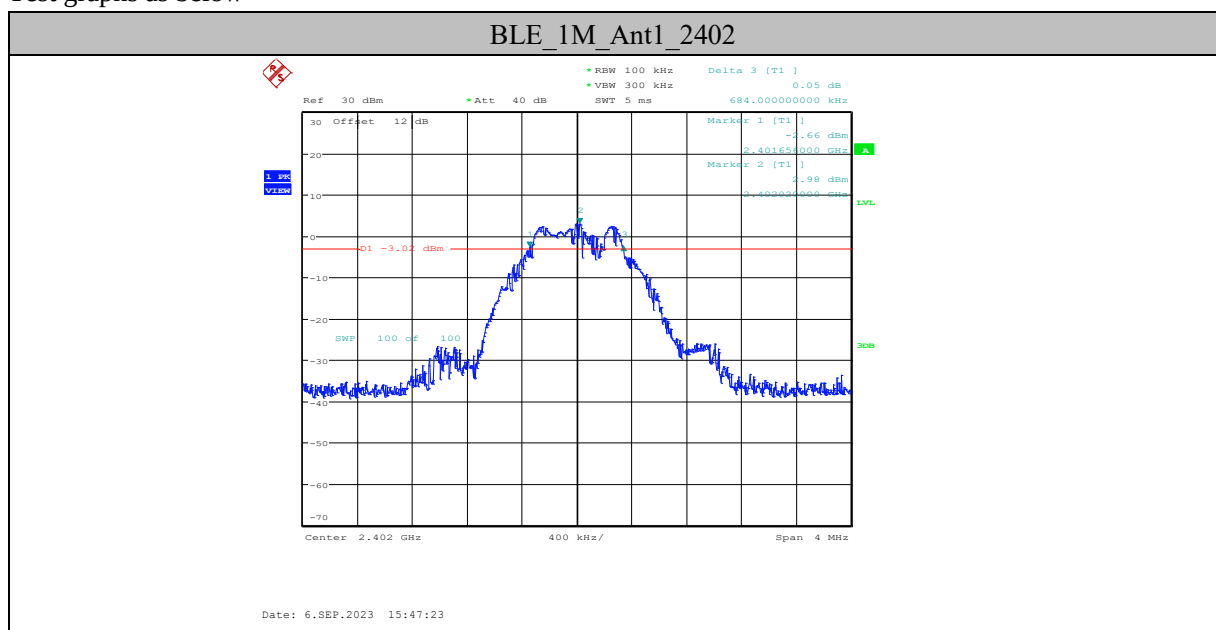
Test Setup:



Measurement Results:

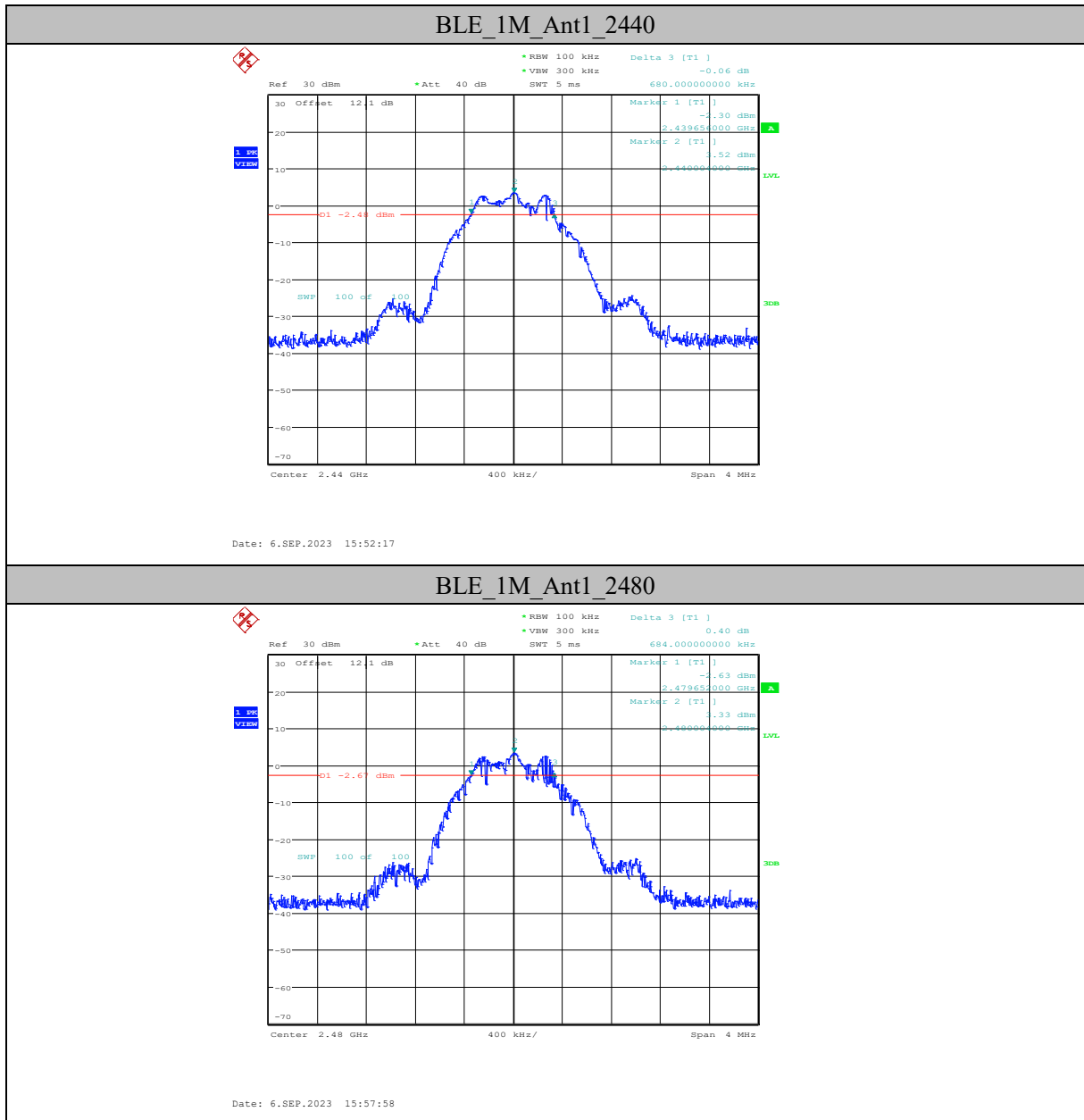
TestMode	Antenna	Frequency[MHz]	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	0.68	2401.66	2402.34	0.5	PASS
		2440	0.68	2439.66	2440.34	0.5	PASS
		2480	0.68	2479.65	2480.34	0.5	PASS
BLE_2M	Ant1	2402	1.19	2401.38	2402.57	0.5	PASS
		2440	1.18	2439.38	2440.56	0.5	PASS
		2480	1.18	2479.38	2480.56	0.5	PASS

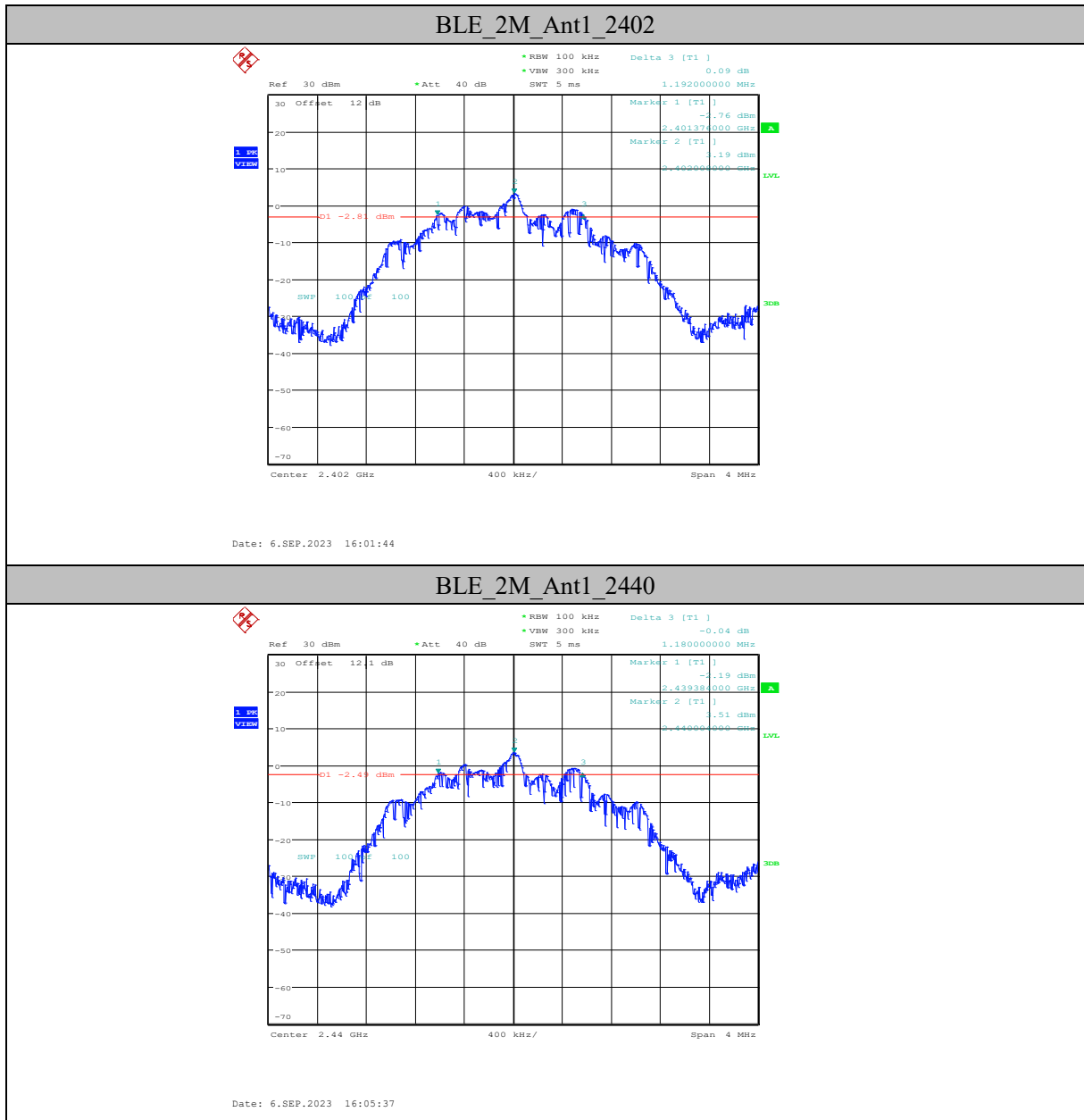
Test graphs as below

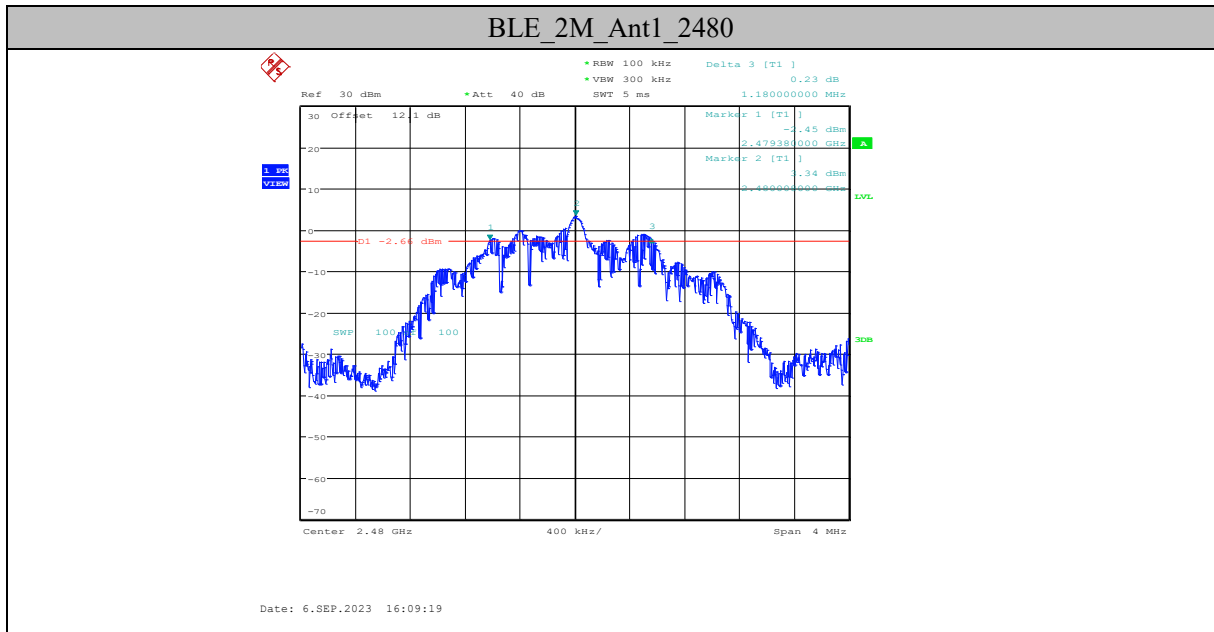


Chongqing Academy of Information and Communication Technology

Address: No. 8, Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China, 401336
Tel: 0086-23-88069965 FAX: 0086-23-88608777







Chongqing Academy of Information and Communication Technology

Address: No. 8, Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China, 401336
Tel: 0086-23-88069965 FAX: 0086-23-88608777

6.5. 99% Occupied Bandwidth

Specifications:	15.247(a)
DUT Serial Number:	S4
Test conditions:	Ambient Temperature:15°C-35°C Relative Humidity:30%-60% Air pressure: 86-106kPa
Test Results:	Pass

Limit Level Construction:

Standard	Limit
15.247(a)	N/A

Measurement Uncertainty:

Measurement Uncertainty	±0.72KHz
-------------------------	----------

Test procedures:

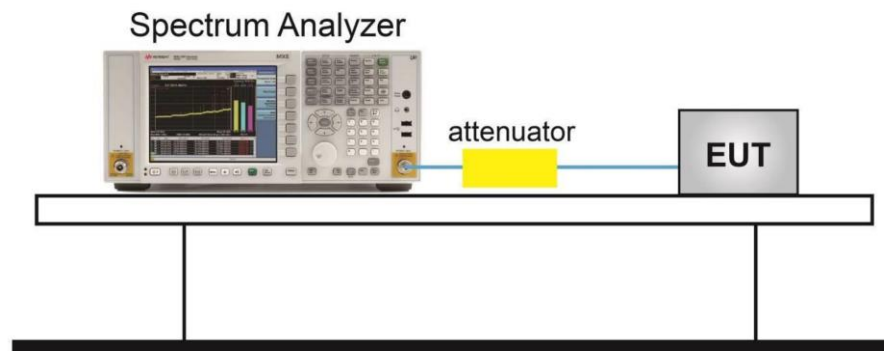
The measurement is according to ANSI C63.10 clause 6.9.3.

1. The output power of EUT was connected to the spectrum analyzer. The path loss was compensated to the results for each measurement.
2. Enable EUT transmitter maximum power continuously.
3. Set RBW shall be in the range of 1% to 5% of the OBW.
4. Set the VBW $\geq [3 \times \text{RBW}]$.
5. Detector = peak.
6. Trace mode = max hold.
7. Sweep = auto couple.
8. Allow the trace to stabilize.
9. The occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5% of the total mean power of the given emission.

Chongqing Academy of Information and Communication Technology

Address: No. 8, Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China, 401336
Tel: 0086-23-88069965 FAX: 0086-23-88608777

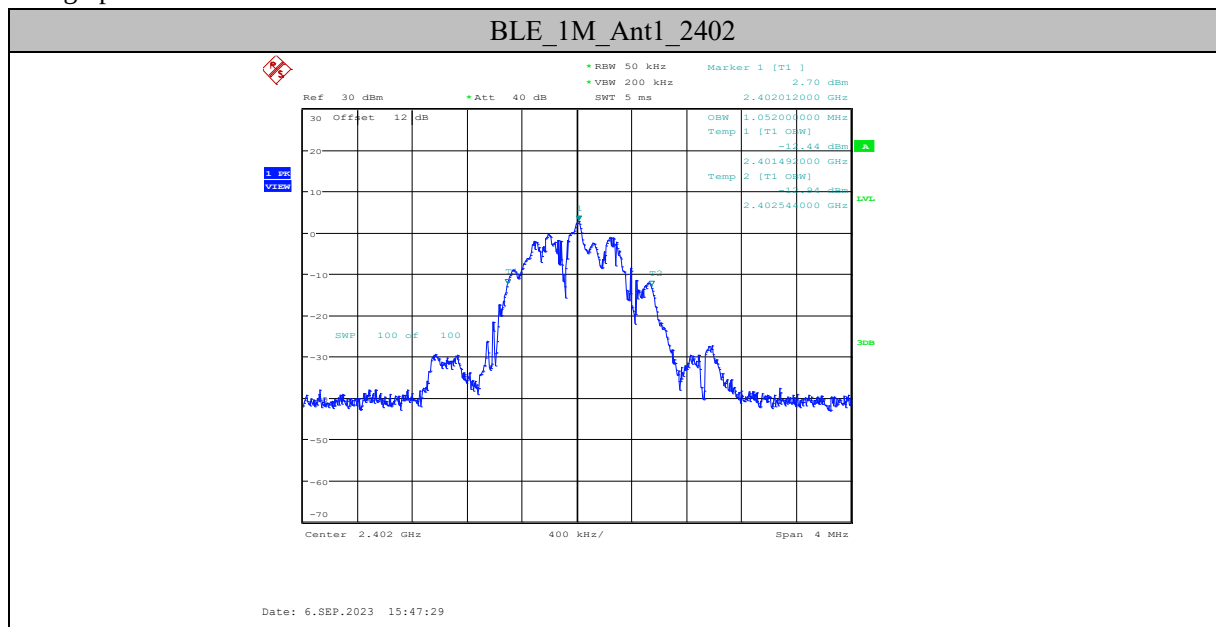
Test setup:



Measurement Results:

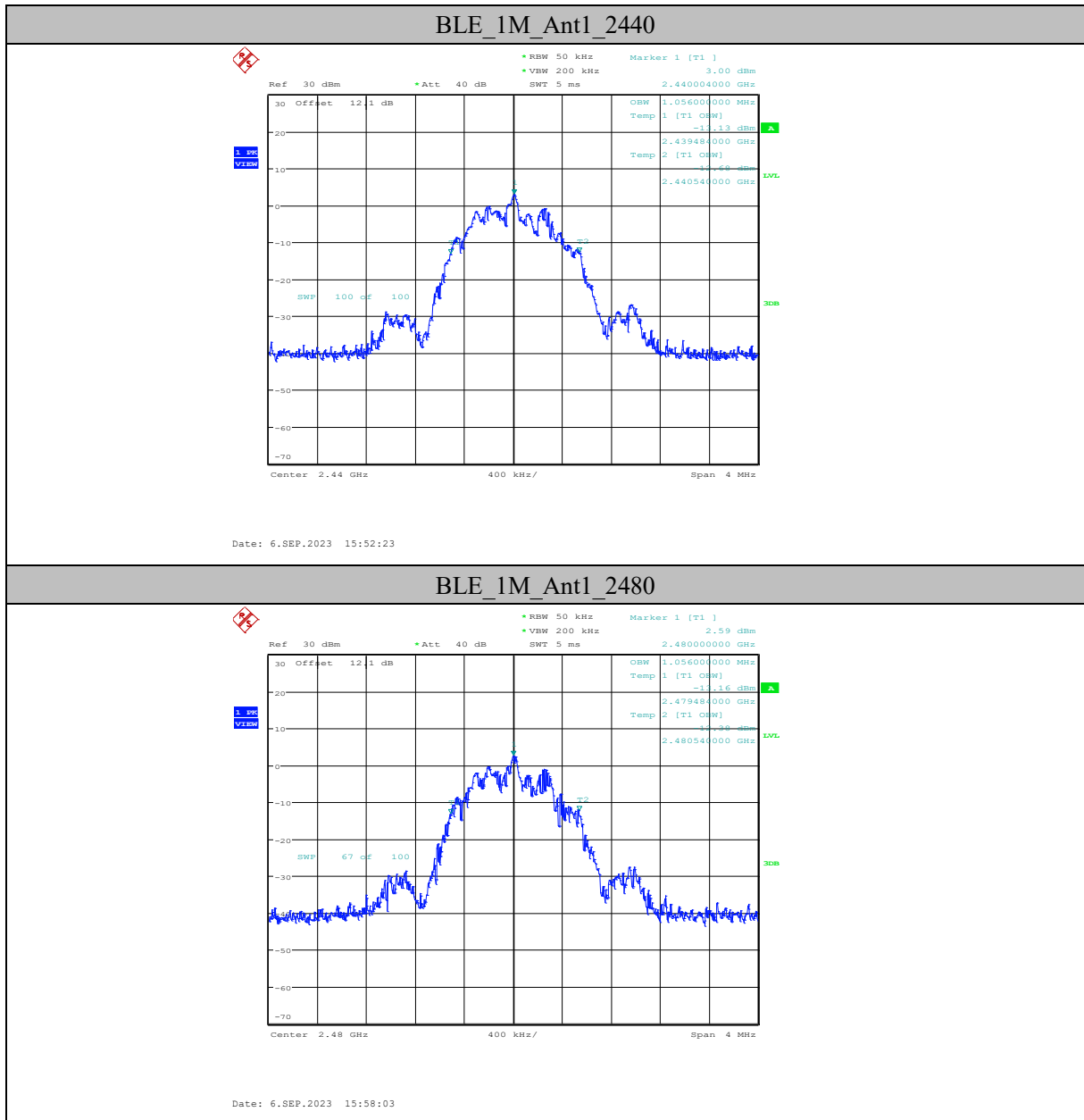
TestMode	Antenna	Frequency[MHz]	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	1.052	2401.4920	2402.5440	---	---
		2440	1.056	2439.4840	2440.5400	---	---
		2480	1.056	2479.4840	2480.5400	---	---
BLE_2M	Ant1	2402	2.072	2400.9800	2403.0520	---	---
		2440	2.064	2438.9840	2441.0480	---	---
		2480	2.064	2478.9800	2481.0440	---	---

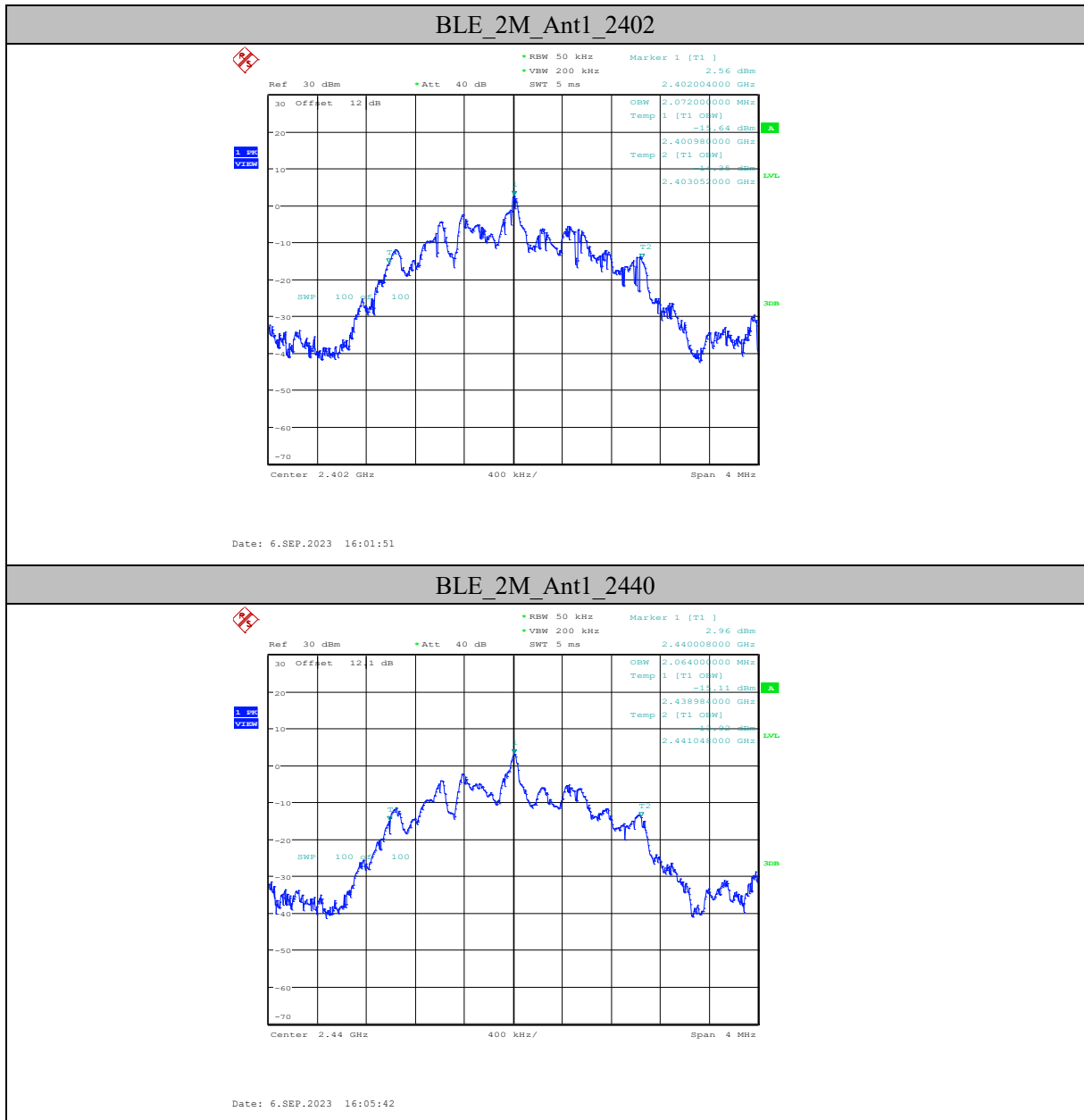
Test graphs as below

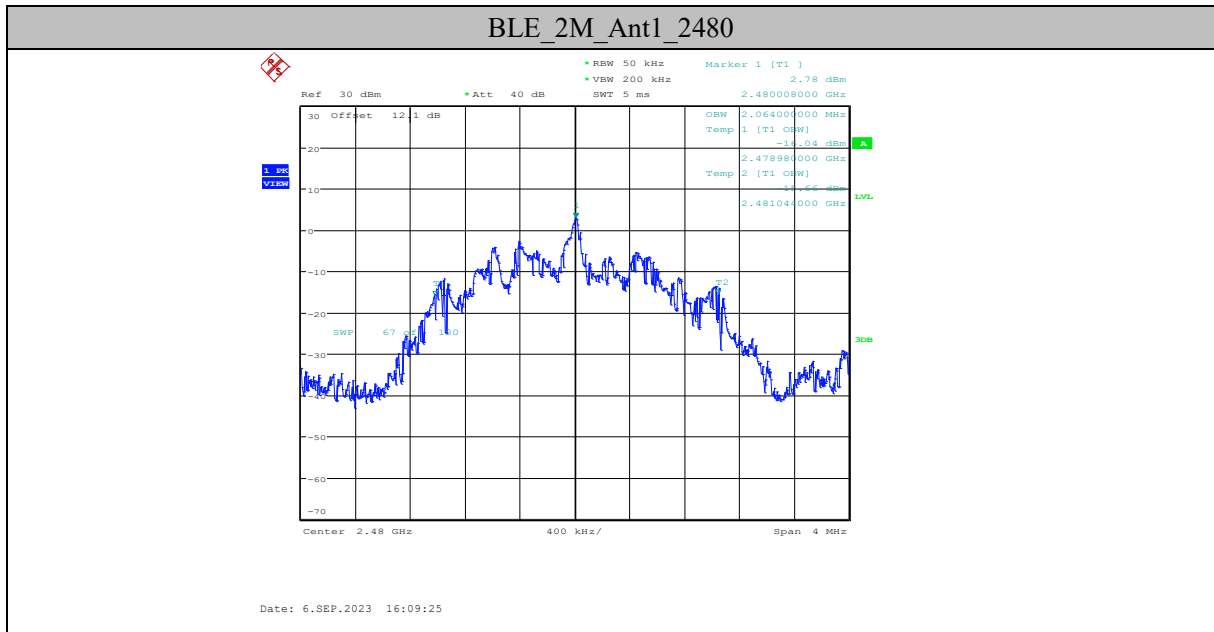


Chongqing Academy of Information and Communication Technology

Address: No. 8, Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China, 401336
Tel: 0086-23-88069965 FAX: 0086-23-88608777







Chongqing Academy of Information and Communication Technology

Address: No. 8, Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China, 401336
 Tel: 0086-23-88069965 FAX: 0086-23-88608777

6.6. Frequency Band Edges-Conducted

Specifications:	FCC 47 Part 15.247(d)
DUT Serial Number:	S4
Test conditions:	Ambient Temperature:15°C-35°C Relative Humidity:30%-60% Air pressure: 86-106kPa
Test Results:	Pass

Limit Level Construction:

Standard	Limit(dBc)
FCC 47 Part 15.247(d)	>20

Measurement Uncertainty:

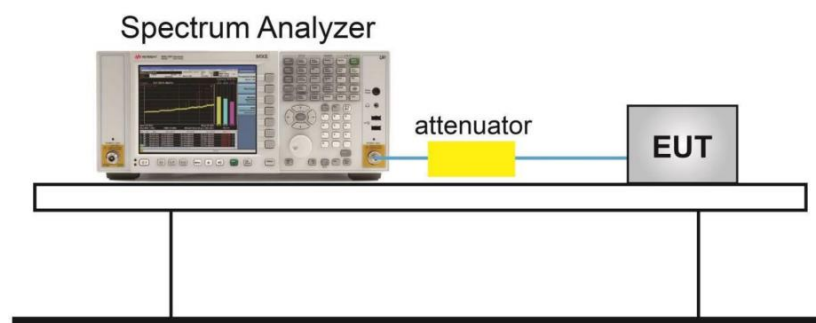
Measurement Uncertainty	$\pm 1.02\text{dBm/KHz}$
-------------------------	--------------------------

Test procedures:

The measurement is according to ANSI C63.10 clause 11.13.2

1. Span: Wide enough to capture the peak level of the emission operating on the channel closest to the band edge, as well as any modulation products that fall outside of the authorized band of operation.
2. Reference level: As required to keep the signal from exceeding the maximum instrument input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than $[10 \log (\text{OBW/RBW})]$ below the reference level. Specific guidance is given in 4.1.5.2.
3. Attenuation: Auto (at least 10 dB preferred).
4. Sweep time: Coupled.
5. Resolution bandwidth: 100 kHz.6) Video bandwidth: 300 kHz.7) Detector: Peak.8) Trace: Max hold.

Test Setup:



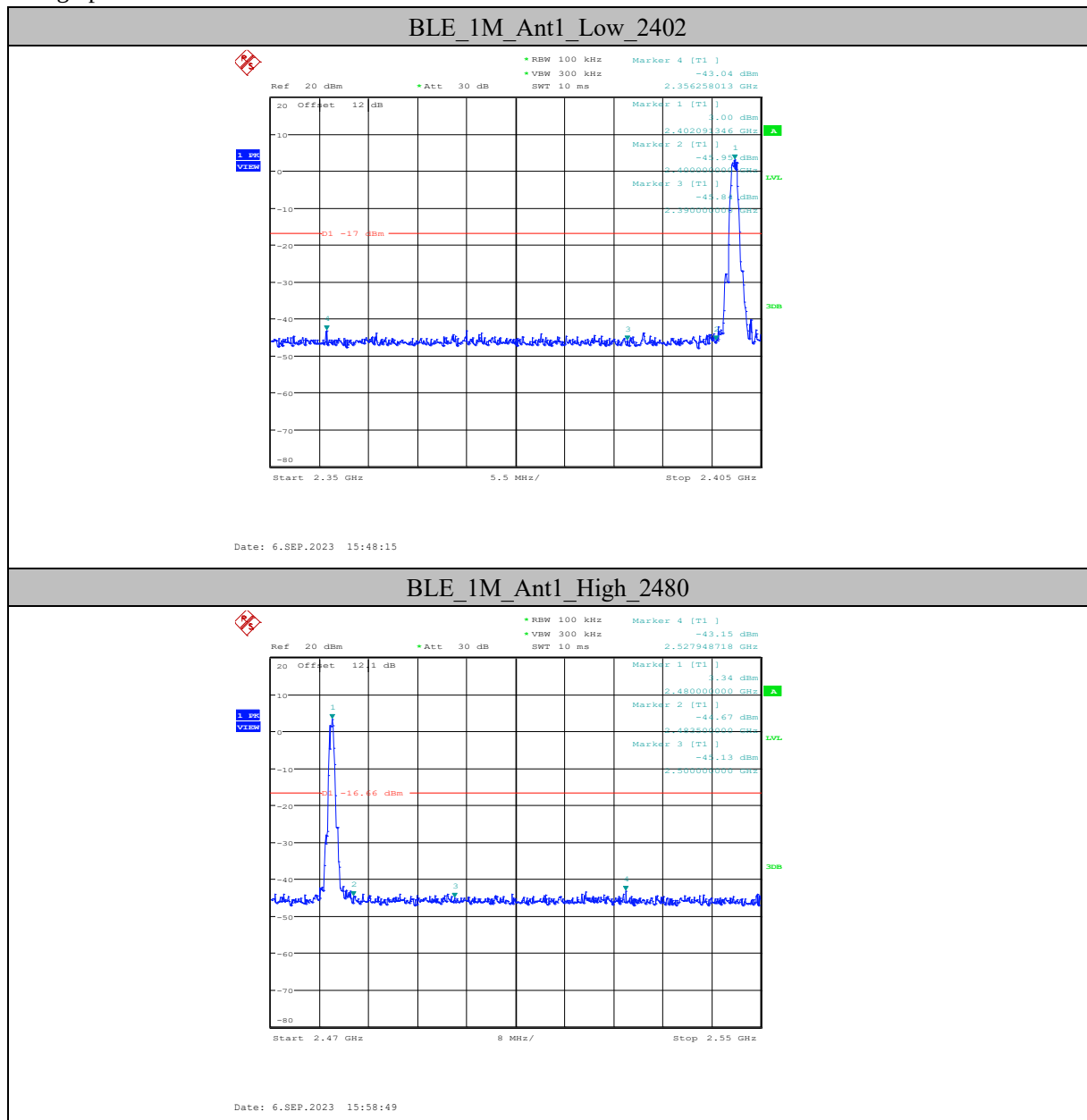
Chongqing Academy of Information and Communication Technology

Address: No. 8,Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China,401336
Tel: 0086-23-88069965 FAX:0086-23-88608777

Measurement Results:

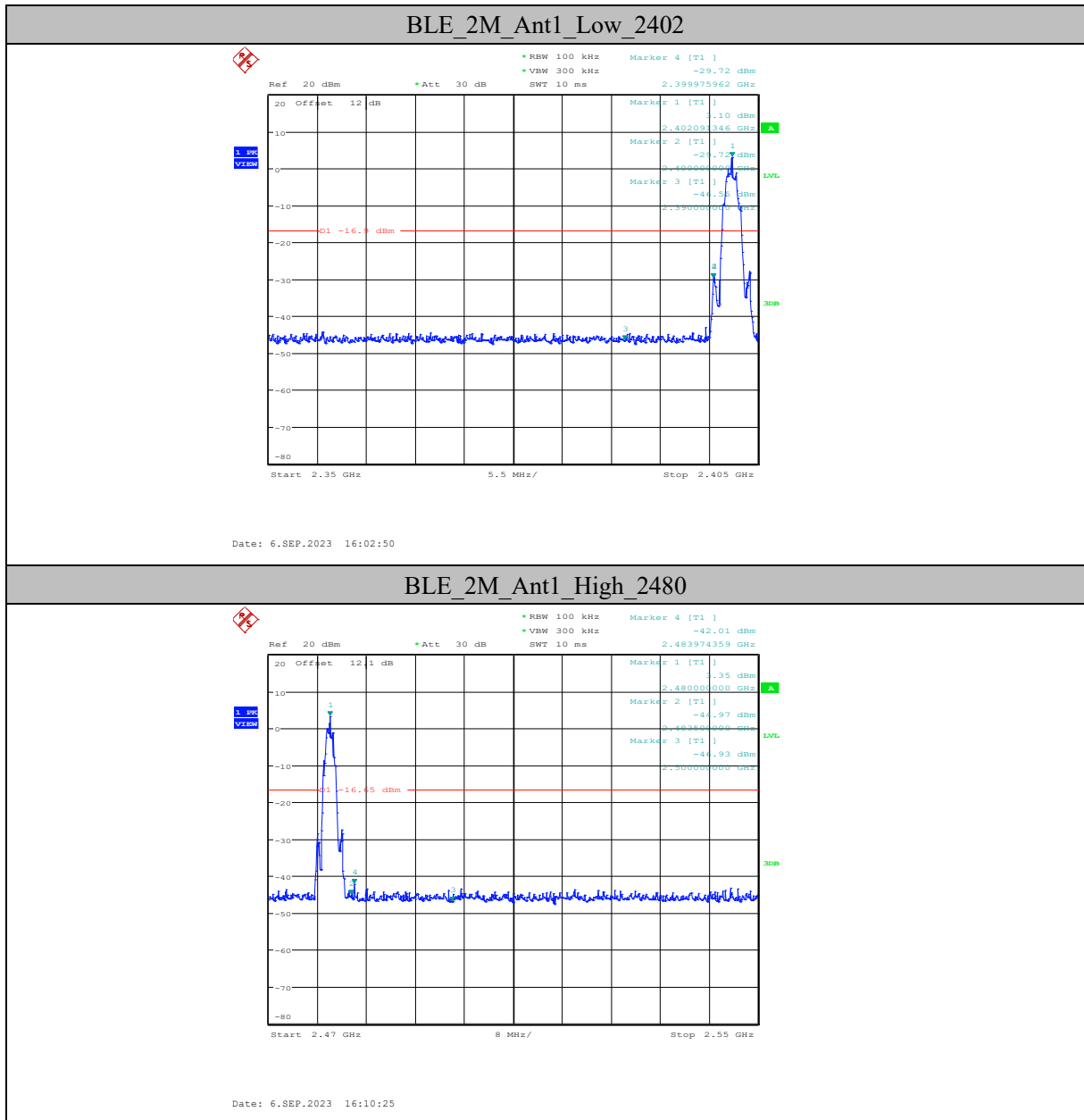
TestMode	Antenna	Channel	Frequency[MHz]	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	Low	2402	3.00	-43.04	≤ -17	PASS
		High	2480	3.34	-43.15	≤ -16.66	PASS
BLE_2M	Ant1	Low	2402	3.10	-29.72	≤ -16.9	PASS
		High	2480	3.35	-42.01	≤ -16.65	PASS

Test graphs as below



Chongqing Academy of Information and Communication Technology

Address: No. 8, Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China, 401336
Tel: 0086-23-88069965 FAX: 0086-23-88608777



6.7. Conducted Emission

Specifications:	FCC 47 Part 15.247(d)
DUT Serial Number:	S4
Test conditions:	Ambient Temperature:15°C-35°C Relative Humidity:30%-60% Air pressure: 86-106kPa
Test Results:	Pass

Limit Level Construction:

Standard	Limit
FCC 47 Part 15.247(d)	20dB below peak output power in 100KHz bandwidth

Measurement Uncertainty:

Measurement Uncertainty	$\pm 1.02\text{dBm/kHz}$
-------------------------	--------------------------

Test procedures:

This measurement is according to ANSI C63.10 clause 11.11.

1. The output power of EUT was connected to the spectrum analyzer. The path loss was compensated to the results for each measurement.
2. Enable EUT transmitter maximum power continuously.

Reference level measurement

3. Set instrument center frequency to DTS channel center frequency.
4. Set the span to ≥ 1.5 times the DTS bandwidth.
5. Set the RBW = 100 kHz.
6. Set the VBW $\geq [3 \times \text{RBW}]$.
7. Detector = peak.
8. Sweep time = auto couple.
9. Trace mode = max hold.
10. Allow trace to fully stabilize.
11. Use the peak marker function to determine the maximum PSD level.

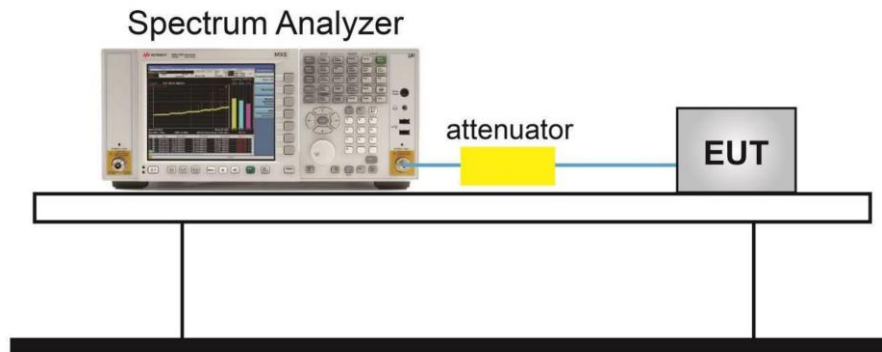
Emission level measurement

1. Set the center frequency and span to encompass frequency range to be measured.
2. Set the RBW = 100 kHz.
3. Set the VBW $\geq [3 \times \text{RBW}]$.
4. Detector = peak.
5. Sweep time = auto couple.
6. Trace mode = max hold.

Chongqing Academy of Information and Communication Technology

Address: No. 8,Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China,401336
Tel: 0086-23-88069965 FAX:0086-23-88608777

7. Allow trace to fully stabilize.
8. Use the peak marker function to determine the maximum amplitude level

Test Setup:

Measurement Results:

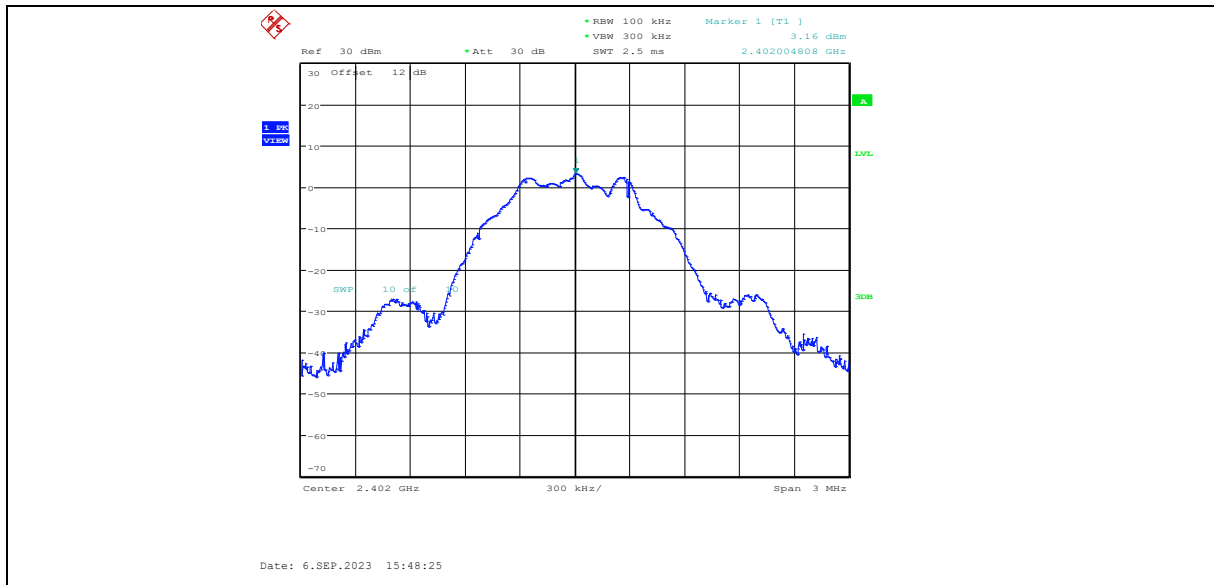
TestMode	Antenna	Frequency [MHz]	FreqRange [MHz]	RefLevel [dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	2402	Reference	3.16	3.16	---	PASS
			30~1000	3.16	-55.17	≤-16.84	PASS
			1000~26500	3.16	-51.19	≤-16.84	PASS
		2440	Reference	3.45	3.45	---	PASS
			30~1000	3.45	-54.32	≤-16.55	PASS
			1000~26500	3.45	-49.11	≤-16.55	PASS
		2480	Reference	3.29	3.29	---	PASS
			30~1000	3.29	-55.09	≤-16.71	PASS
			1000~26500	3.29	-47.82	≤-16.71	PASS
BLE_2M	Ant1	2402	Reference	3.21	3.21	---	PASS
			30~1000	3.21	-54.82	≤-16.79	PASS
			1000~26500	3.21	-49.52	≤-16.79	PASS
		2440	Reference	3.46	3.46	---	PASS
			30~1000	3.46	-53.8	≤-16.54	PASS
			1000~26500	3.46	-49.02	≤-16.54	PASS
		2480	Reference	3.31	3.31	---	PASS
			30~1000	3.31	-55.32	≤-16.69	PASS
			1000~26500	3.31	-48.65	≤-16.69	PASS

Test graphs as below

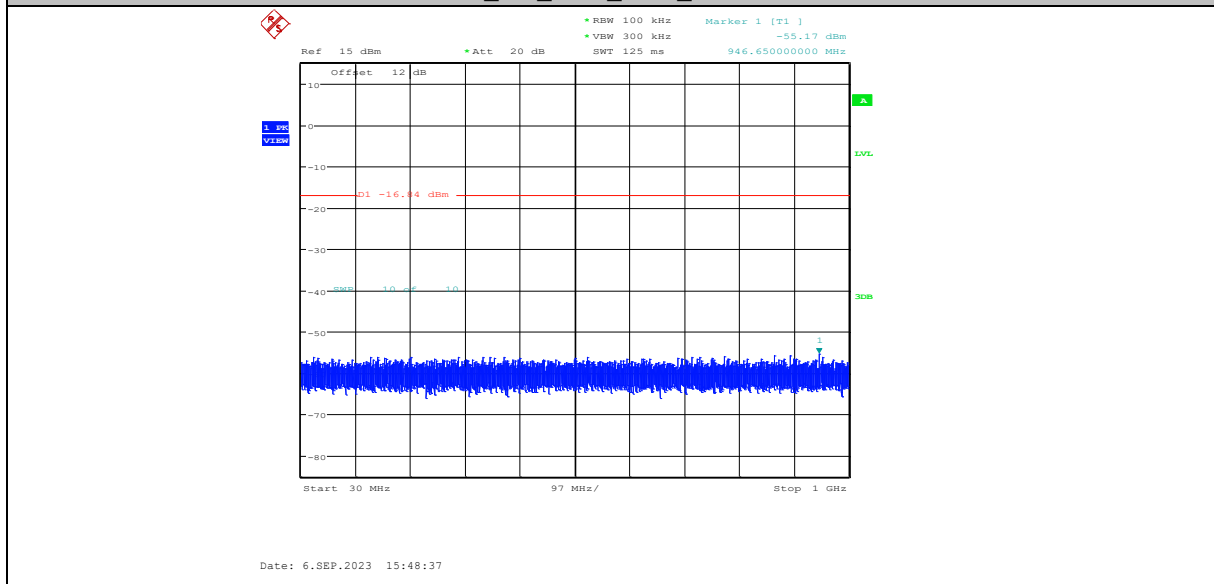
BLE_1M_Ant1_2402_0~Reference

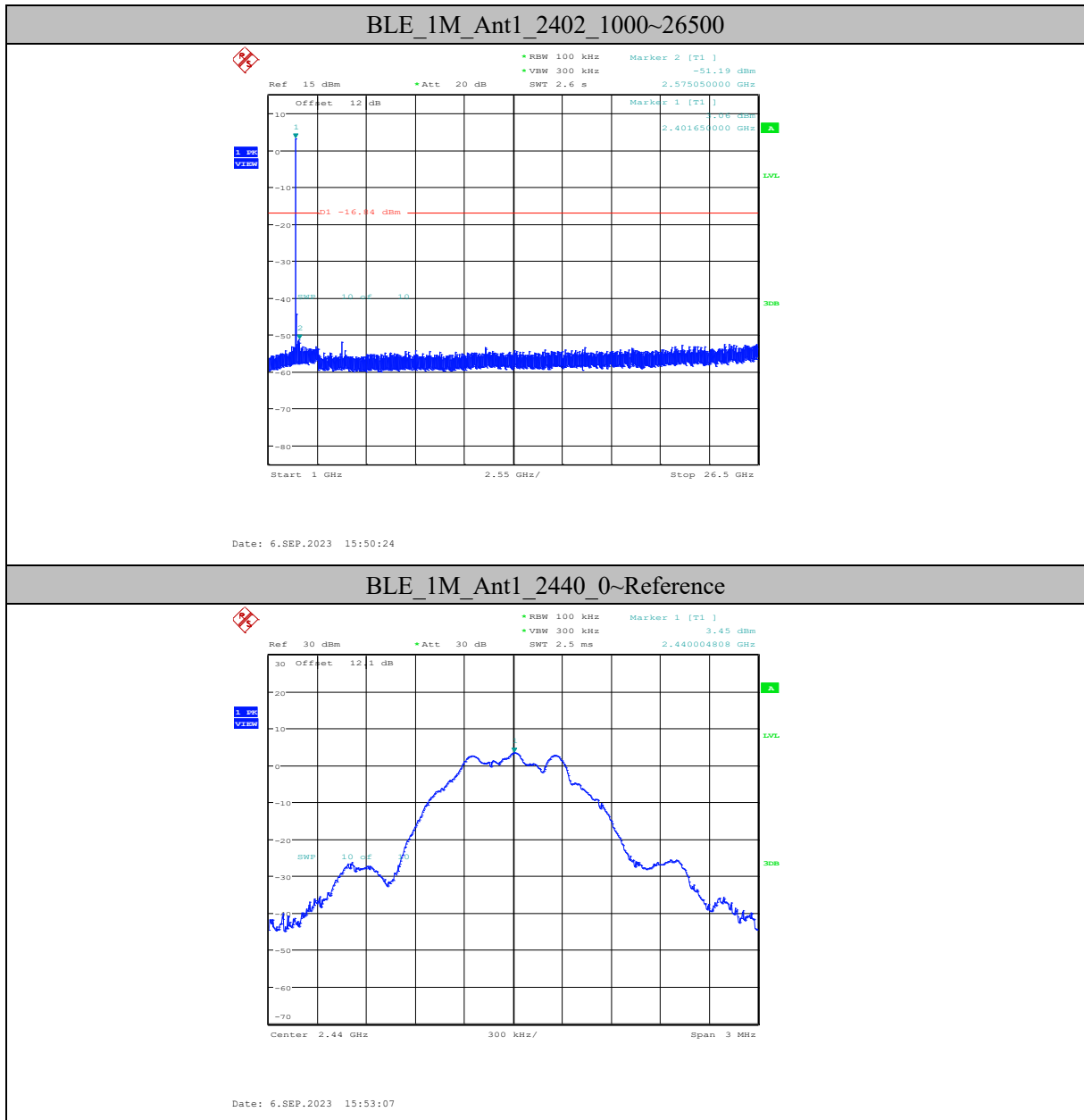
Chongqing Academy of Information and Communication Technology

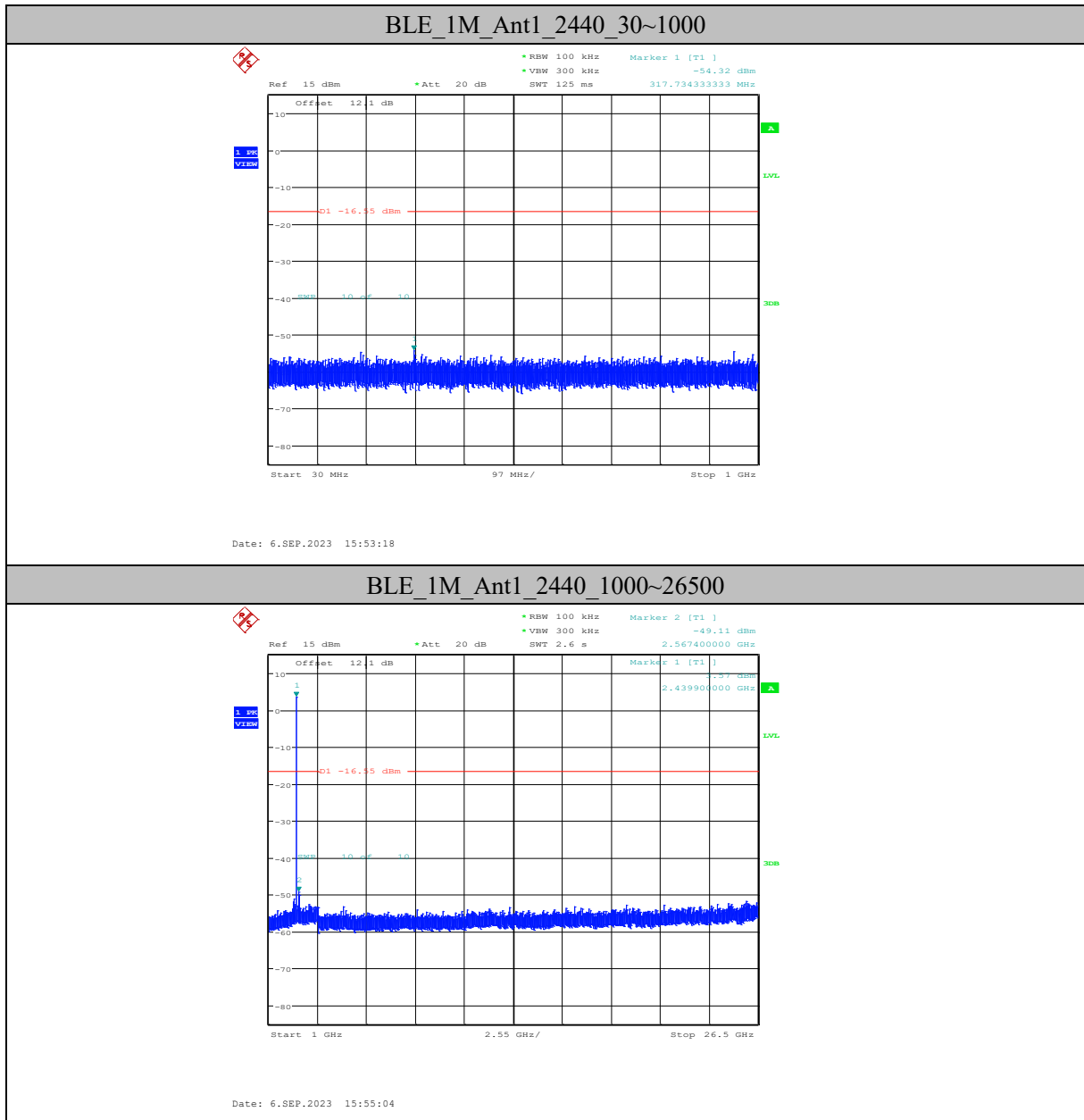
Address: No. 8,Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China,401336
 Tel: 0086-23-88069965 FAX:0086-23-88608777

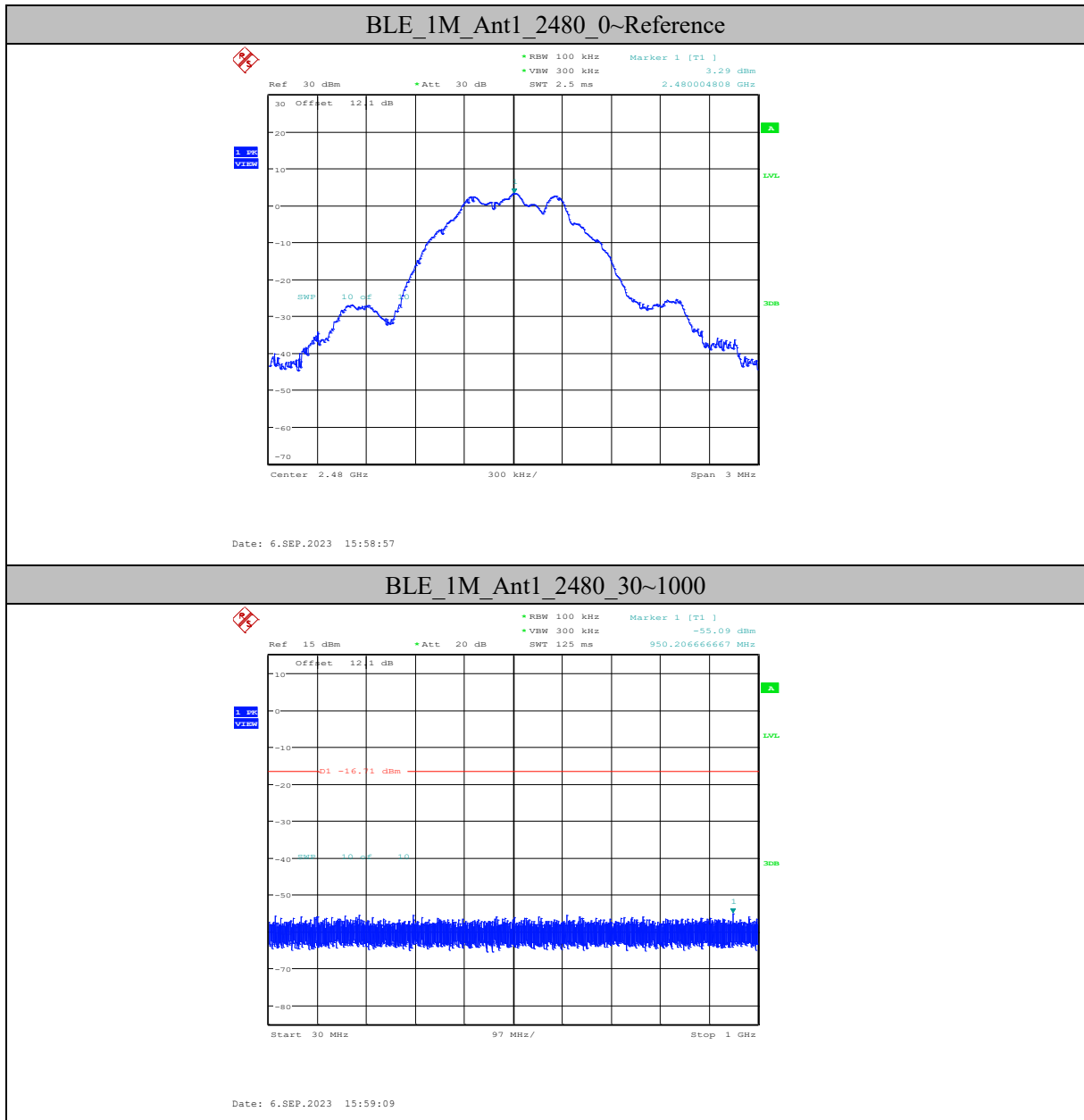


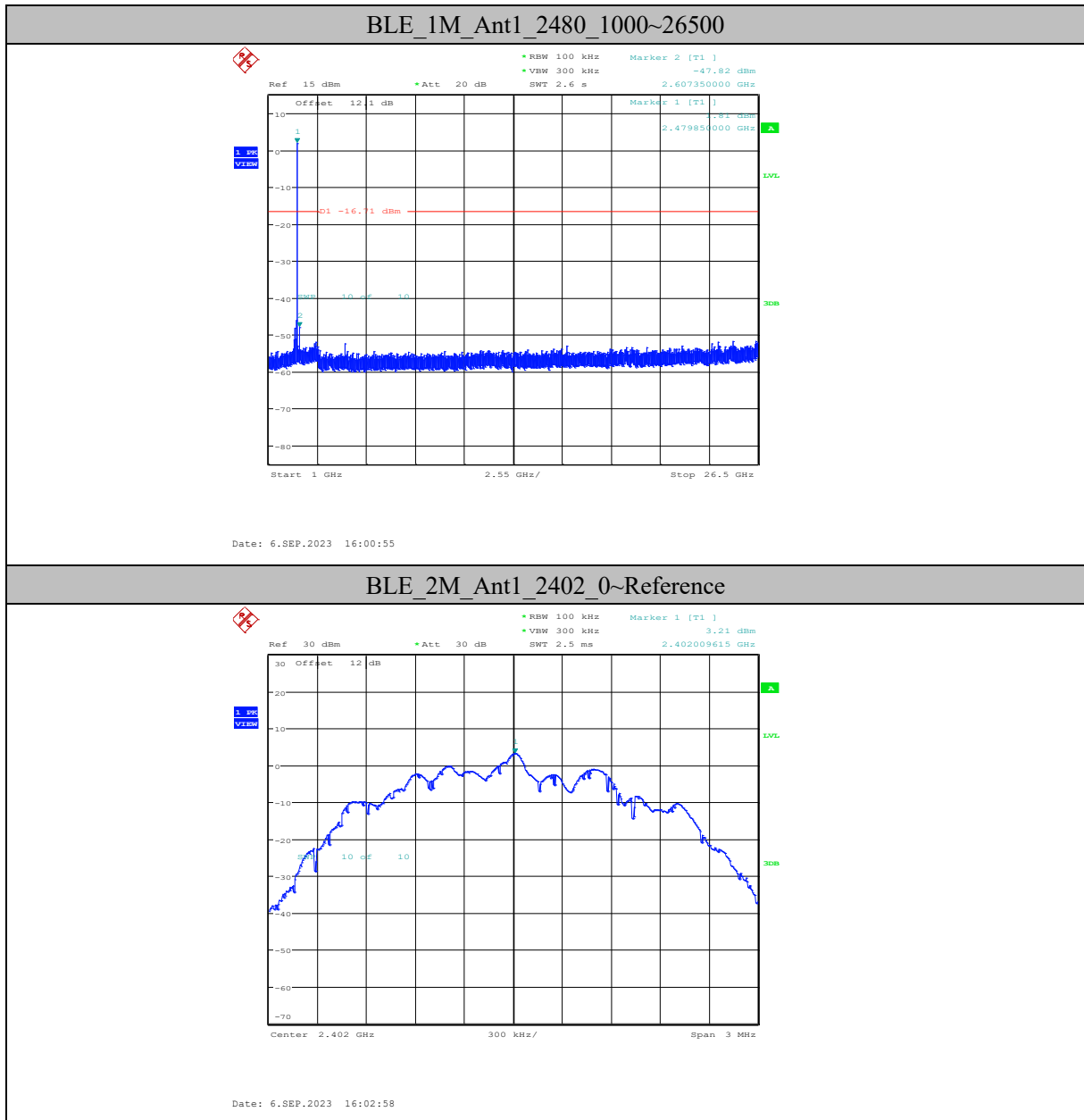
BLE_1M_Ant1_2402_30~1000













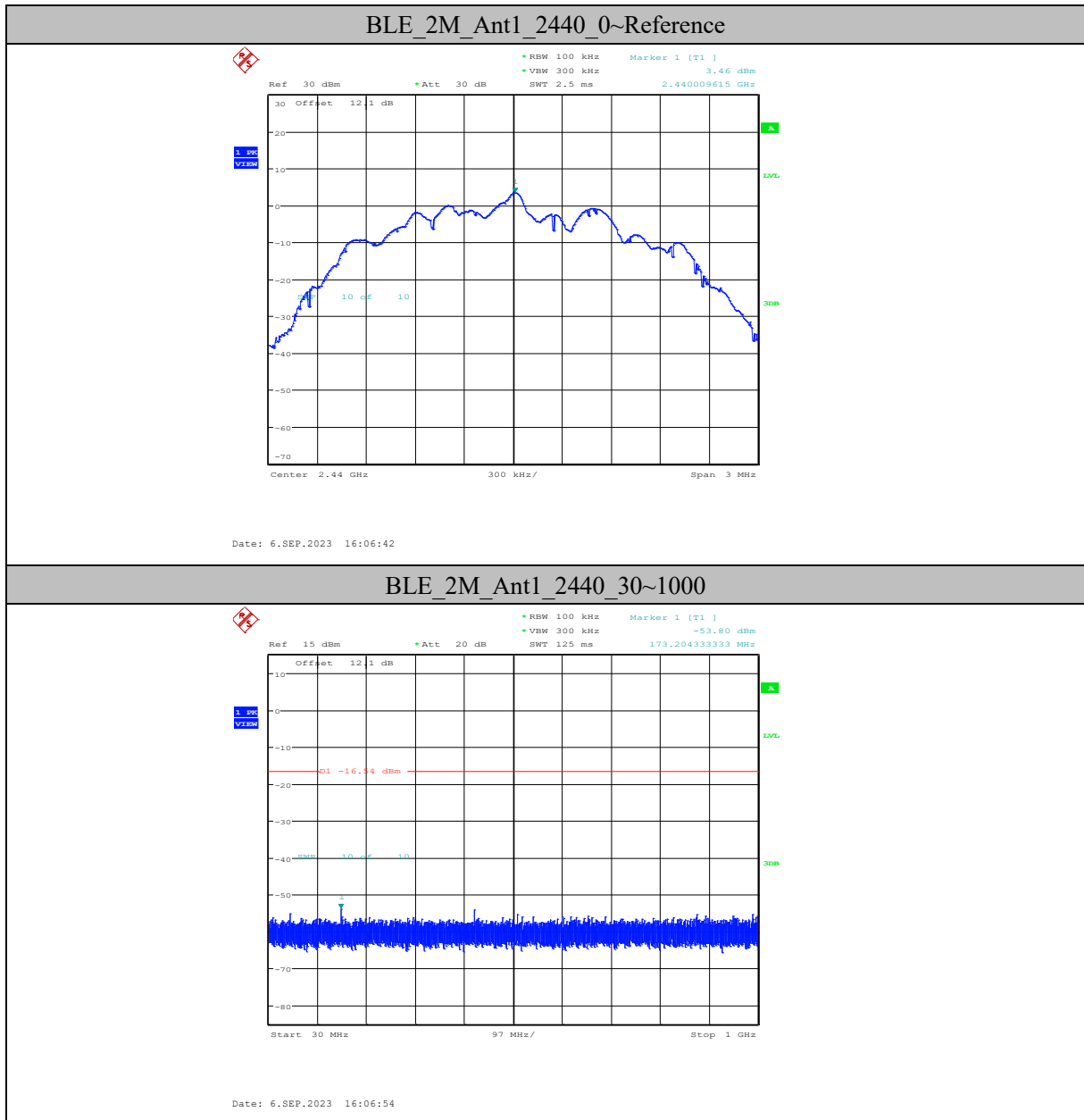
BLE_2M_Ant1_2402_30~1000

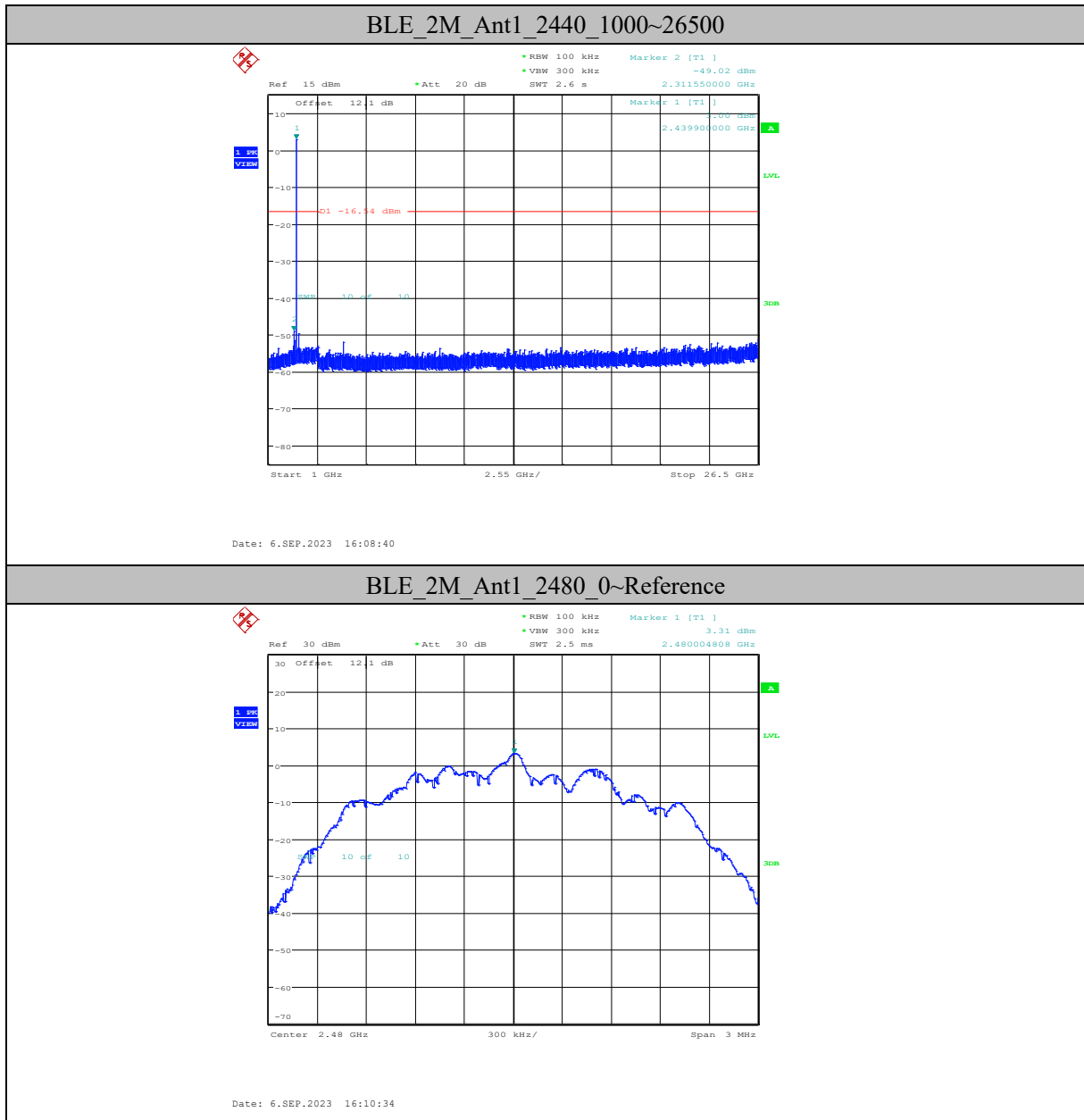


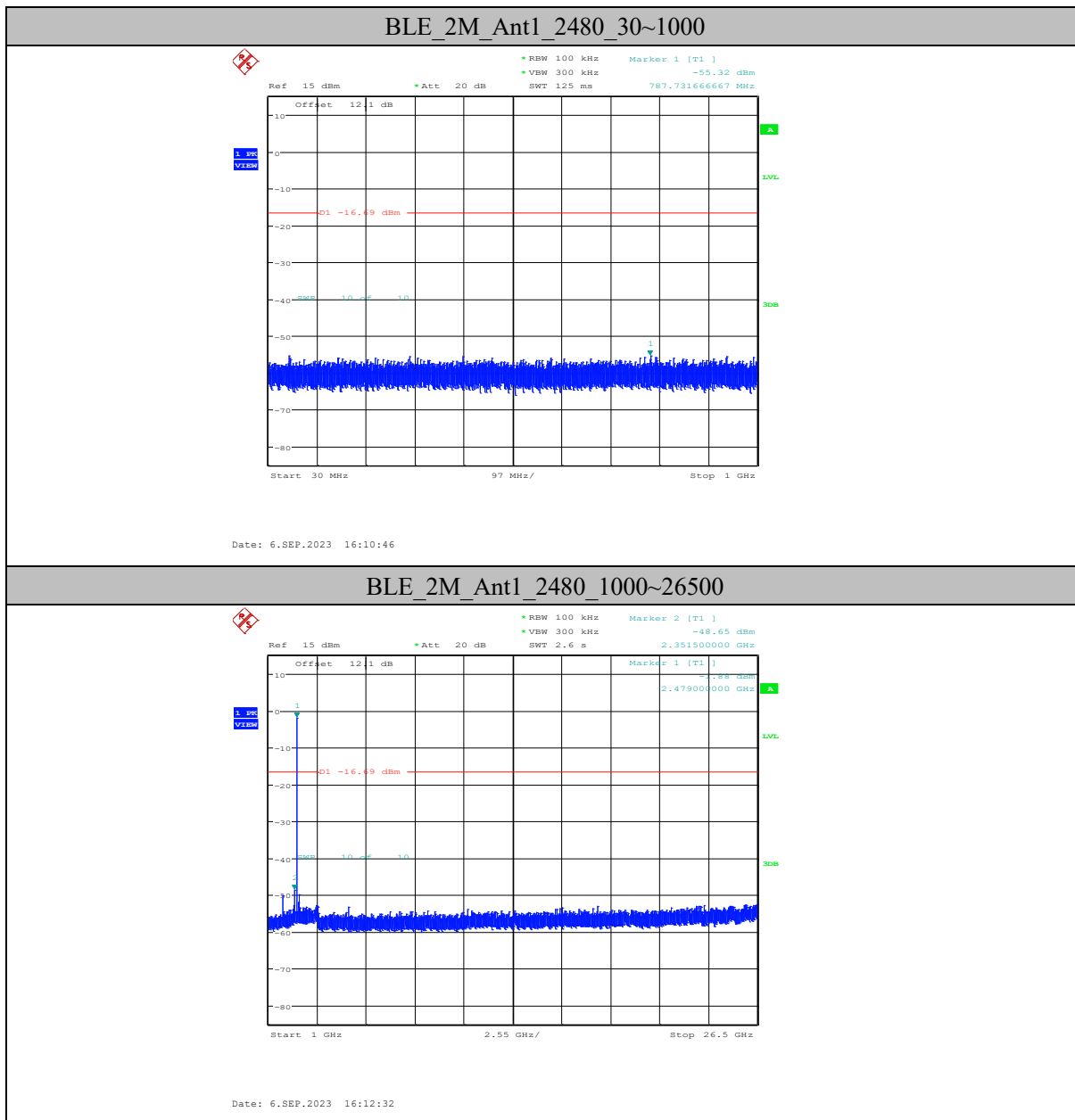
BLE_2M_Ant1_2402_1000~26500



Page 43 of 65







6.8. Radiated Emission

Specifications:	FCC 47 Part 15.247(d),15.205(a),15.209(a)
DUT Serial Number:	S1
Test conditions:	Ambient Temperature:15°C-35°C Relative Humidity:30%-60% Air pressure: 86-106kPa
Test Results:	Pass

Limit Level Construction:

Standard	Limit
FCC 47 Part 15.247(d),15.205(a),15.209(a)	20dB below peak output power in 100KHz bandwidth

In addition, radiated emissions which fall in the restricted bands, as defined in 15.205(a), must also comply with the radiated emission limits specified in 15.209(a) (see 15.205(c)).

Limit in restricted band

Frequency of emission (MHz)	Field strength (uV/m)	Field strength (dBuV/m)
0.009~0.49	2400/F (kHz)	129-94
0.49~1.705	24000/F (kHz)	74-63
1.705~30	30	70
30~88	100	40
88~216	150	43.5
216~960	200	46
Above 960	500	54

Measurement Uncertainty:

Measurement Uncertainty	30MHz-150MHz: 3.79 dB (k=2). 150MHz-1000MHz: 3.51dB (k=2). 1000MHz-6000MHz: 4.84 dB (k=2). 6000MHz-18000MHz: 4.52 dB (k=2).
-------------------------	--

Test procedures:

Portable, small, lightweight, or modular devices that may be handheld, worn on the body, or placed on a table

Chongqing Academy of Information and Communication Technology

Address: No. 8,Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China,401336
Tel: 0086-23-88069965 FAX:0086-23-88608777

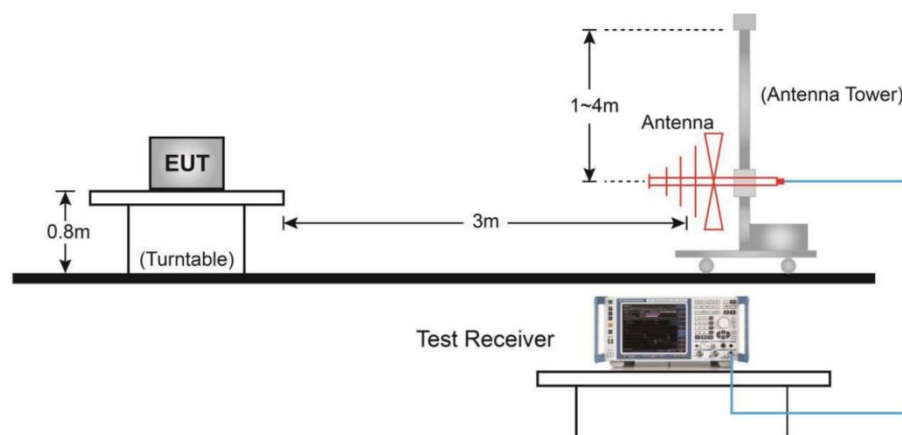
during operation shall be positioned on a non-conducting platform, the top of which is 80 cm above the reference ground plane. The preferred area occupied by the EUT arrangement is 1 m by 1.5 m, but it may be larger or smaller to accommodate various sized EUTs. For testing purposes, ceiling- and wall-mounted devices also shall be positioned on a tabletop (see also ANSI C63.10-2013 section 6.3.4 and 6.3.5). In making any tests involving handheld, body-worn, or ceiling-mounted equipment, it is essential to recognize that the measured levels may be dependent on the orientation (attitude) of the three orthogonal axes of the EUT. Thus, exploratory tests as specified in 8.3.1 shall be carried out for various axes orientations to determine the attitude having maximum or near-maximum emission level.

The EUT was placed on a non-conductive table. The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.

Frequency of emission (MHz)	RBW/VBW	Sweep Time (s)
0.009~30	9KHz/30KHz	Auto
30~1000	100KHz/300KHz	5
1000~4000	1MHz/3MHz	15
4000~18000	1MHz/3MHz	40
18000~26500	1MHz/3MHz	20

Test Setup:

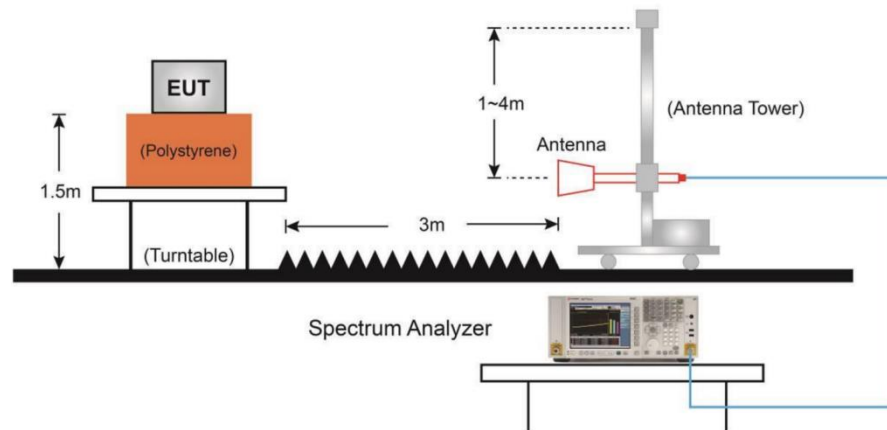
Below 1GHz Test Setup



Chongqing Academy of Information and Communication Technology

Address: No. 8, Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China, 401336
Tel: 0086-23-88069965 FAX: 0086-23-88608777

Above 1GHz Test Setup



Measurement Results:

A “reference path loss” is established and A_{Rpi} is the attenuation of “reference path loss”, and including the gain of receive antenna, the gain of the preamplifier, the cable loss.

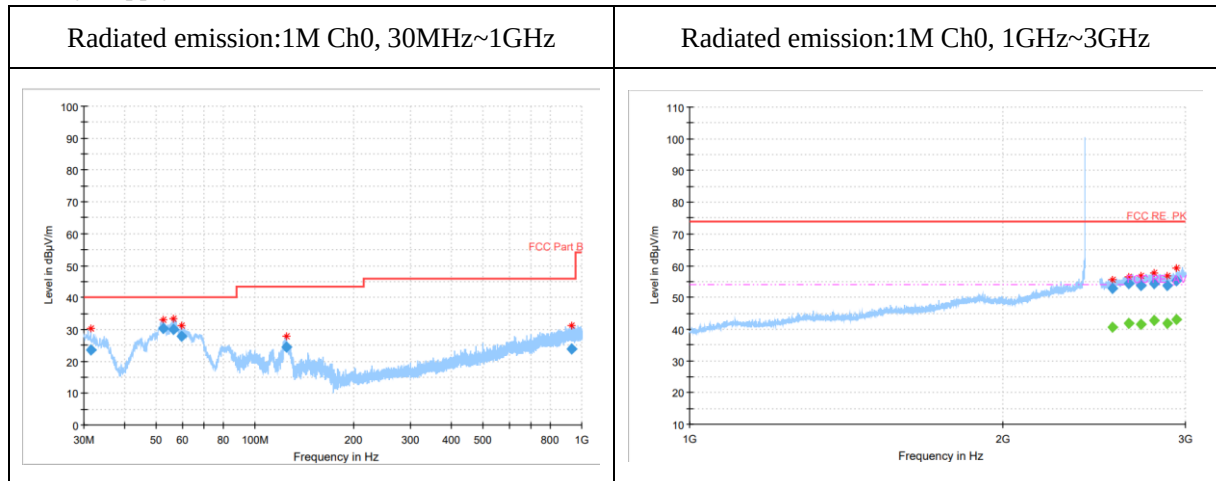
The measurement results are obtained as described below:

$$A_{Rpi} = \text{Cable loss} + \text{Antenna Factor} - \text{Preamplifier gain}$$

$$\text{Result} = P_{Mea} + A_{Rpi}$$

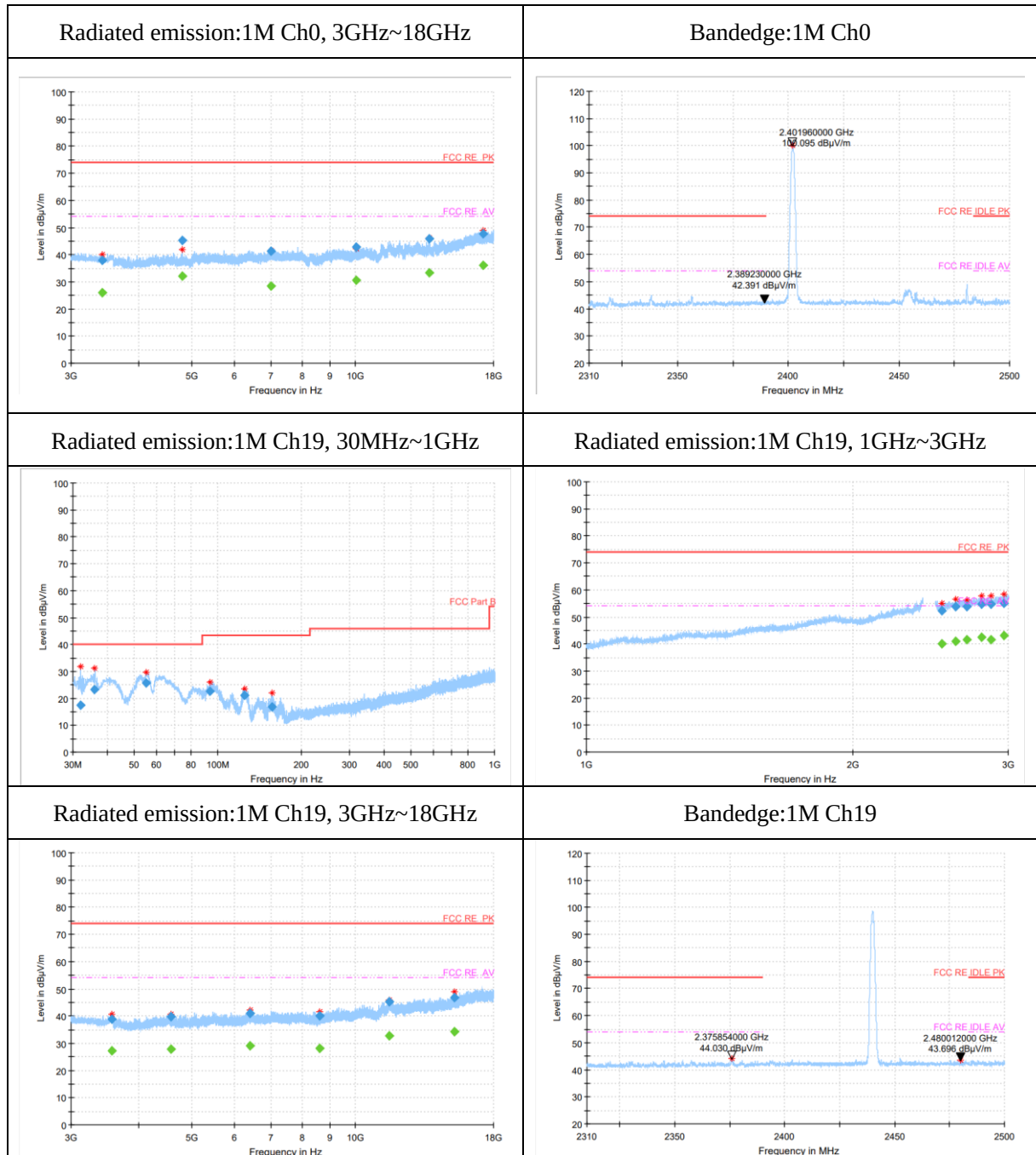
The test data below 30MHz is more than 20dB lower than the limit value, so it is not provided in the report.

Mainly Supply:



Chongqing Academy of Information and Communication Technology

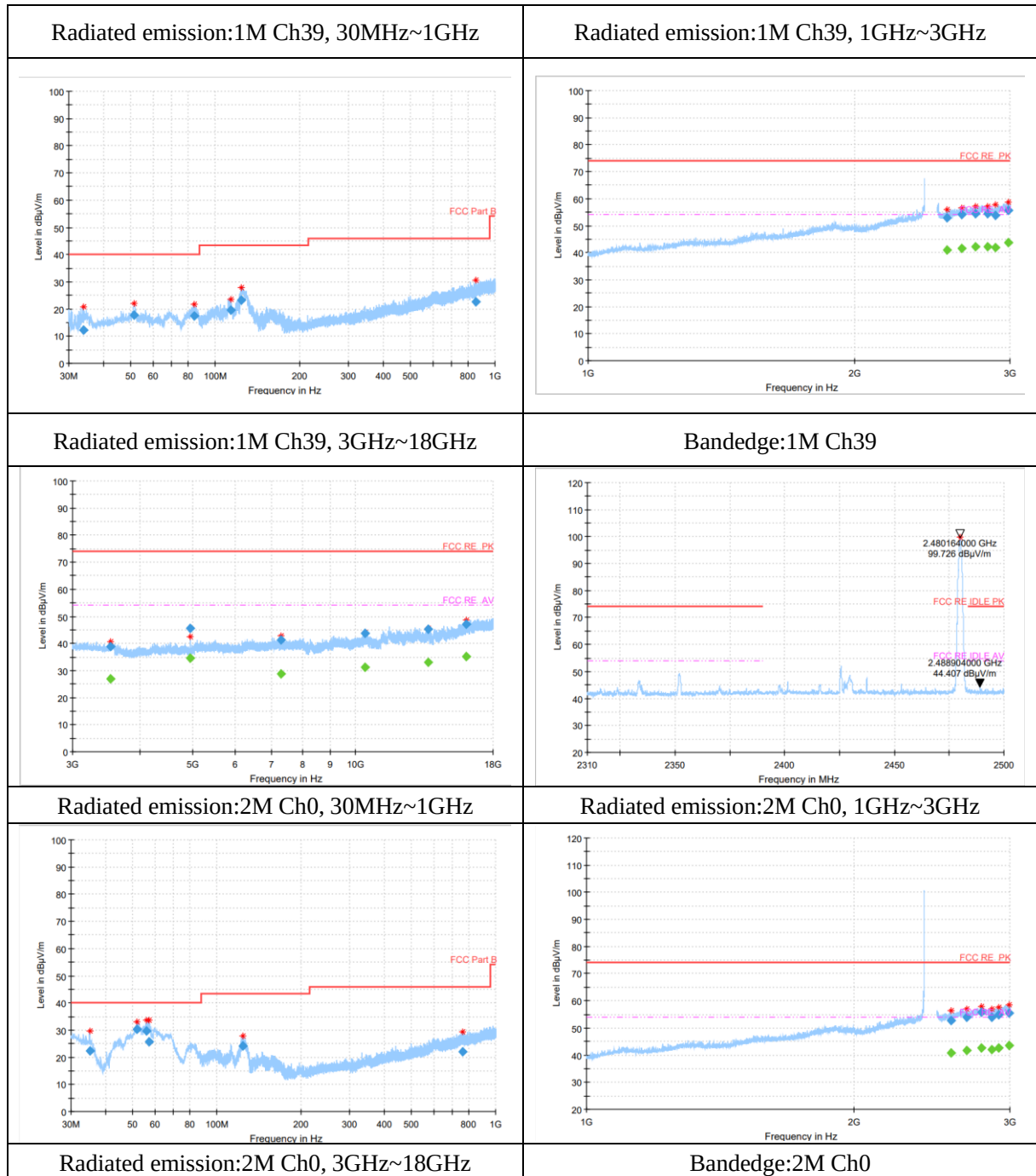
Address: No. 8,Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China,401336
Tel: 0086-23-88069965 FAX:0086-23-88608777

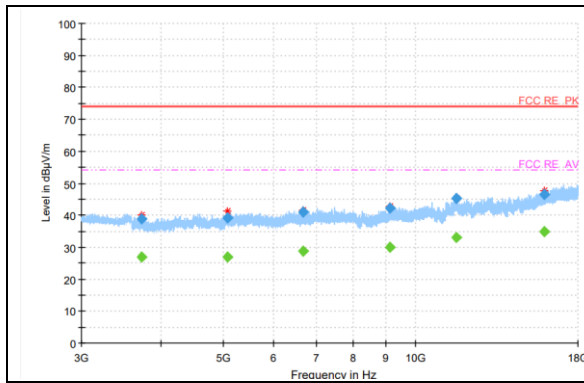


Chongqing Academy of Information and Communication Technology

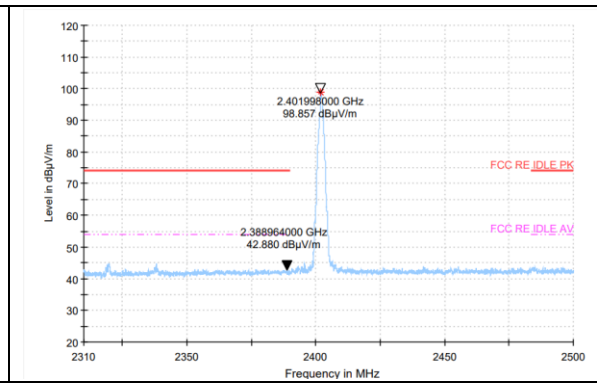
Address: No. 8,Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China,401336
Tel: 0086-23-88069965

FAX:0086-23-88608777

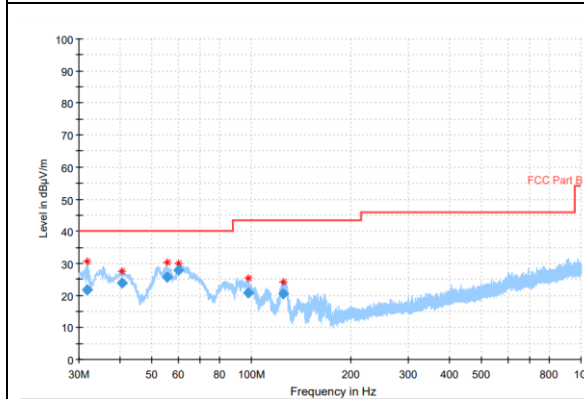




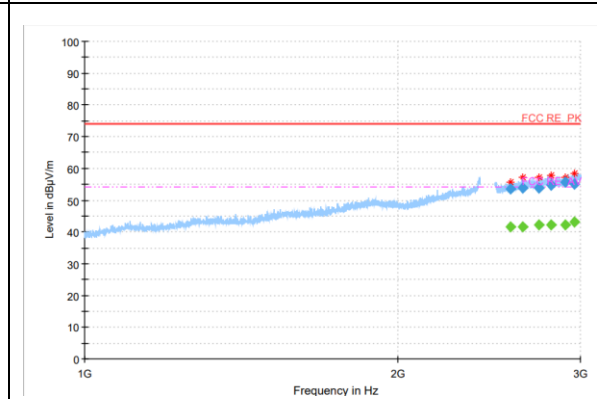
Radiated emission:2M Ch19, 30MHz~1GHz



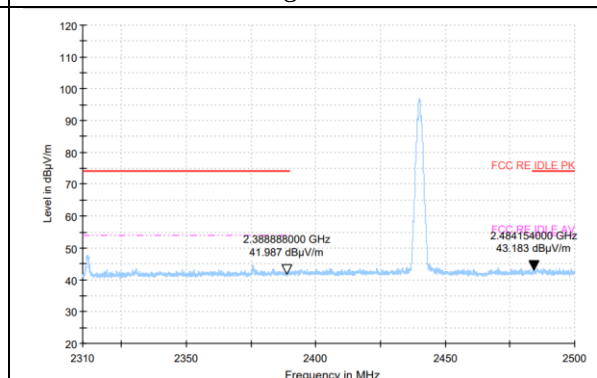
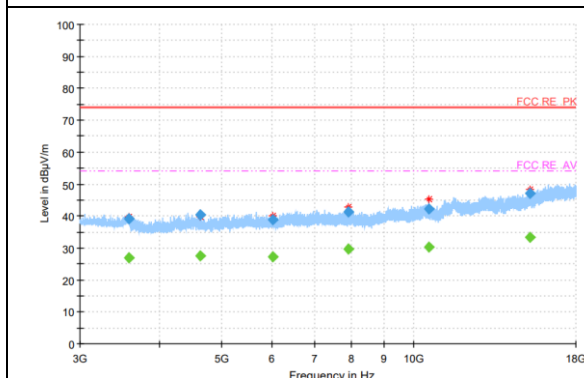
Radiated emission:2M Ch19, 1GHz~3GHz

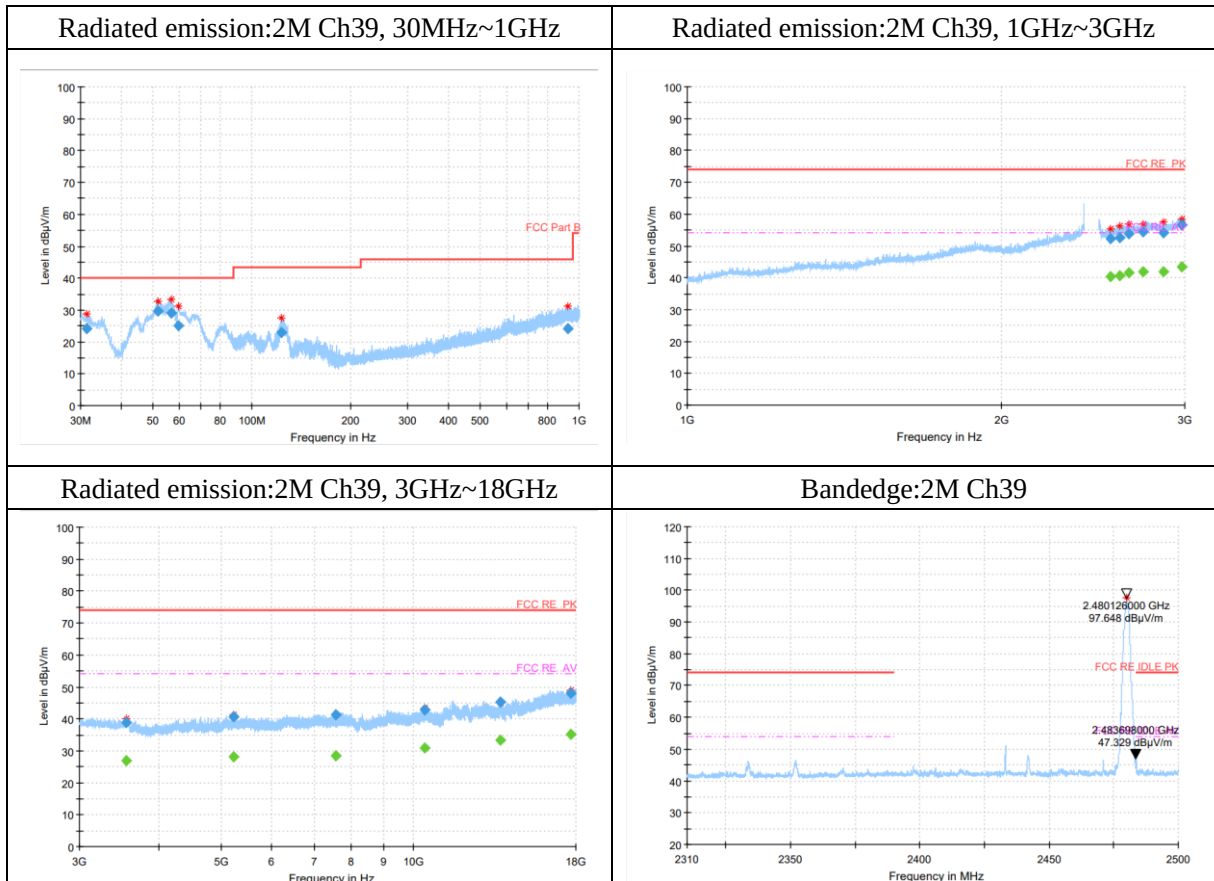


Radiated emission:2M Ch19, 3GHz~18GHz



Bandedge:2M Ch19





Note1: The out-of- limit signal in the picture is the main frequency signal.

Note2: Only data in worst mode is provided.

Note3: Sweep the whole frequency band through the range from 30MHz to the 5th harmonic of the carrier, the Emissions in the frequency band 18GHz-40GHz is more than 20dB below the limit are not report.

RSE-1M-CH0-30M-1G-

Frequency (MHz)	Result (dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Polarity
31.6	23.67	-16	39.67	V
52.4	30.17	-12	42.17	V
56.2	29.82	-12	41.82	V
59.7	27.74	-12	39.74	V
124.7	24.43	-15	39.43	H
934.0	23.98	1	22.98	V

Chongqing Academy of Information and Communication Technology

Address: No. 8,Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China,401336
Tel: 0086-23-88069965 FAX:0086-23-88608777

RSE-1M-CH0-1G-3G

Frequency (MHz)	Result (dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Polarity
2552.8	52.81	16	36.81	V
2643.4	54.21	17	37.21	H
2718.7	53.83	17	36.83	H
2798.8	54.41	18	36.41	V
2880.0	53.68	18	35.68	H
2941.0	55.12	19	36.12	H

RSE-1M-CH0-1G-3G (Average)

Frequency (MHz)	Result (dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Polarity
2643.4	41.69	17	24.69	H
2798.8	42.68	18	24.68	V
2941.0	42.96	19	23.96	H

RSE-1M-CH0-3G-18G

Frequency (MHz)	Result (dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Polarity
3427.0	38.06	-7	45.06	H
4804.1	45.32	-4	49.32	V
7012.2	41.21	-2	43.21	V
10068.5	42.77	0	42.77	V
13679.1	45.94	4	41.94	V
17198.3	47.72	10	37.72	H

RSE-1M-CH19-30M-1G

Frequency (MHz)	Result (dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Polarity
32.1	17.56	-16	33.56	V
36.0	23.36	-15	38.36	V
55.3	25.57	-12	37.57	V

Chongqing Academy of Information and Communication Technology

Address: No. 8, Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China, 401336
 Tel: 0086-23-88069965 FAX: 0086-23-88608777

94.0	22.53	-14	36.53	V
124.6	21.23	-15	36.23	H
157.6	16.67	-16	32.67	H

RSE-1M-CH19-1G-3G

Frequency (MHz)	Result (dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Polarity
2524.4	52.26	15	37.26	H
2616.2	53.77	17	36.77	H
2693.5	53.68	17	36.68	V
2795.8	54.79	18	36.79	H
2869.9	54.82	18	36.82	V
2968.8	54.9	19	35.9	H

RSE-1M-CH19-1G-3G- (Average)

Frequency (MHz)	Result (dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Polarity
2795.8	42.62	18	24.62	H
2869.9	41.74	18	23.74	V
2968.8	43.14	19	24.14	H

RSE-1M-CH19-3G-18G-

Frequency (MHz)	Result (dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Polarity
3565.8	38.94	-6	44.94	H
4581.6	39.68	-4	43.68	H
6407.0	40.97	-2	42.97	V
8619.0	40.12	-2	42.12	V
11559.6	45.32	3	42.32	V
15261.2	46.86	7	39.86	H

RSE-1M-CH39-30M-1G-

Frequency (MHz)	Result (dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Polarity
-----------------	-----------------	-----------	---------------	----------

Chongqing Academy of Information and Communication Technology

Address: No. 8,Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China,401336
Tel: 0086-23-88069965 FAX:0086-23-88608777

33.9	12.34	-15	27.34	H
51.4	17.66	-12	29.66	H
84.2	17.58	-17	34.58	H
113.5	19.63	-13	32.63	H
123.8	23.22	-15	38.22	H
851.1	22.66	0	22.66	H

RSE-1M-CH39-1G-3G-

Frequency (MHz)	Result (dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Polarity
2543.9	52.8	16	36.8	H
2646.4	54.2	17	37.2	H
2743.5	54.53	18	36.53	V
2832.7	54.44	18	36.44	H
2885.6	53.69	18	35.69	V
2988.9	55.76	19	36.76	H

RSE-1M-CH39-1G-3G- (Average)

Frequency (MHz)	Result (dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Polarity
2646.4	41.67	17	24.67	H
2743.5	42.25	18	24.25	V
2832.7	42.07	18	24.07	H
2988.9	43.65	19	24.65	H

RSE-1M-CH39-3G-18G-

Frequency (MHz)	Result (dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Polarity
3530.4	38.71	-6	44.71	V
4960.0	45.46	-3	48.46	V
7303.2	41.29	-2	43.29	H
10418.6	43.75	1	42.75	H

Chongqing Academy of Information and Communication Technology

Address: No. 8,Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China,401336
Tel: 0086-23-88069965 FAX:0086-23-88608777

13676.7	45.4	4	41.4	H
16065.8	46.99	9	37.99	H

RSE-2M-CH0-30M-1G-

Frequency (MHz)	Result (dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Polarity
35.1	22.18	-15	37.18	V
51.9	30.23	-12	42.23	V
56.1	29.79	-12	41.79	V
57.2	25.7	-12	37.7	V
123.9	24.09	-15	39.09	H
760.1	22.05	0	22.05	V

RSE-2M-CH0-1G-3G-

Frequency (MHz)	Result (dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Polarity
2572.7	52.79	16	36.79	H
2680.2	53.82	17	36.82	V
2788.2	55.93	18	37.93	H
2860.1	53.82	18	35.82	V
2912.6	54.71	18	36.71	H
2991.1	55.45	19	36.45	H

RSE-2M-CH0-1G-3G- (Average)

Frequency (MHz)	Result (dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Polarity
2788.2	42.58	18	24.58	H
2912.6	42.53	18	24.53	H
2991.1	43.6	19	24.6	H

RSE-2M-CH0-3G-18G-

Frequency (MHz)	Result (dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Polarity
3726.3	38.71	-6	44.71	H

Chongqing Academy of Information and Communication Technology

Address: No. 8,Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China,401336
Tel: 0086-23-88069965 FAX:0086-23-88608777

5083.3	39.06	-1	40.06	H
6682.9	41.08	-2	43.08	H
9142.8	42.3	-1	43.3	V
11620.2	45.2	3	42.2	H
15945.3	46.62	9	37.62	V

RSE-2M-CH19-30M-1G-

Frequency (MHz)	Result (dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Polarity
31.8	21.65	-16	37.65	V
40.5	23.88	-13	36.88	V
55.4	25.69	-12	37.69	V
60.2	27.73	-13	40.73	V
98.1	20.91	-13	33.91	V
125.3	20.56	-15	35.56	H

RSE-2M-CH19-1G-3G-

Frequency (MHz)	Result (dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Polarity
2567.7	53.4	16	37.4	H
2642.2	53.86	17	36.86	H
2738.0	53.84	18	35.84	V
2808.1	54.79	18	36.79	V
2901.1	55.65	18	37.65	H
2961.1	54.93	19	35.93	V

RSE-2M-CH19-1G-3G- (Average)

Frequency (MHz)	Result (dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Polarity
2808.1	42.35	18	24.35	V
2901.1	42.32	18	24.32	H
2961.1	43.05	19	24.05	V

Chongqing Academy of Information and Communication Technology

Address: No. 8,Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China,401336
Tel: 0086-23-88069965 FAX:0086-23-88608777

RSE-2M-CH19-3G-18G-

Frequency (MHz)	Result (dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Polarity
3578.8	39.04	-6	45.04	V
4631.9	40.27	-4	44.27	V
6026.5	38.95	-4	42.95	H
7905.3	41.41	-1	42.41	H
10591.7	42.31	1	41.31	H
15236.5	47.07	7	40.07	H

RSE-2M-CH39-30M-1G-

Frequency (MHz)	Result (dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Polarity
31.4	24.11	-16	40.11	V
51.8	29.8	-12	41.8	V
56.6	28.95	-12	40.95	V
59.9	25.15	-12	37.15	V
123.0	23.01	-15	38.01	H
924.3	24.02	1	23.02	H

RSE-2M-CH39-1G-3G-

Frequency (MHz)	Result (dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Polarity
2543.5	52.22	16	36.22	H
2600.5	52.55	16	36.55	H
2651.8	53.73	17	36.73	H
2734.8	54.52	18	36.52	H
2863.3	53.98	18	35.98	V
2981.5	56.51	19	37.51	V

RSE-2M-CH39-1G-3G- (Average)

Frequency (MHz)	Result (dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Polarity
-----------------	-----------------	-----------	---------------	----------

Chongqing Academy of Information and Communication Technology

Address: No. 8,Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China,401336
 Tel: 0086-23-88069965 FAX:0086-23-88608777

2734.8	42.02	18	24.02	H
2981.5	43.49	19	24.49	V

RSE-2M-CH39-3G-18G-

Frequency (MHz)	Result (dB μ V/m)	ARpl (dB)	PMea (dB μ V/m)	Polarity
3555.0	38.91	-6	44.91	V
5228.4	40.65	-2	42.65	V
7567.0	41.26	-2	43.26	V
10437.6	42.92	1	41.92	H
13697.2	45.26	4	41.26	V
17657.7	47.91	10	37.91	H

6.9. AC Powerline Conducted Emission

Specifications:	FCC 47 Part 15.207
DUT Serial Number:	S1
Test conditions:	Ambient Temperature:15°C-35°C Relative Humidity:30%-60% Air pressure: 86-106kPa
Test Results:	Pass

Method of Measurement: ANSI C63.10-2013-clause 6.2

1.The one EUT cable configuration and arrangement and mode of operation that produced the emission with the highest amplitude relative to the limit is selected for the final measurement, while applying the appropriate modulating signal to the EUT.

2.If the EUT is relocated from an exploratory test site to a final test site, the highest emissions shall be remaximized at the final test location before final ac power-line conducted emission measurements are performed.

3.The final test on all current-carrying conductors of all of the power cords to the equipment that comprises the EUT (but not the cords associated with other non-EUT equipment in the system) is then performed for the full frequency range for which the EUT is being tested for compliance without further variation of the EUT arrangement, cable positions, or EUT mode of operation.

4.If the EUT is comprised of equipment units that have their own separate ac power connections, e.g., floor-standing equipment with independent power cords for each shelf that are able to connect directly to the ac power network, each current-carrying conductor of one unit is measured while the other units are connected to a second (or more) LISN(s). All units shall be separately measured. If a power strip is provided by the manufacturer, to supply all of the units making up the EUT, only the conductors in the power cord of the power strip shall be measured.

If the EUT uses a detachable antenna, these measurements shall be made with a suitable dummy load connected to the antenna output terminals; otherwise, the tests shall be made with the antenna connected and, if adjustable, fully extended. When measuring the ac conducted emissions from a device that operates between 150 kHz and 30 MHz a non-detachable antenna may be replaced with a dummy load for the measurements within the fundamental emission band of the transmitter, but only for those measurements.³⁶ Record the six highest EUT emissions relative to the limit of each of the current-carrying conductors of the power cords of the equipment that comprises the EUT over the frequency range specified by the procuring or regulatory agency. Diagram or photograph the test setup that was used. See Clause 8 for full reporting requirements.

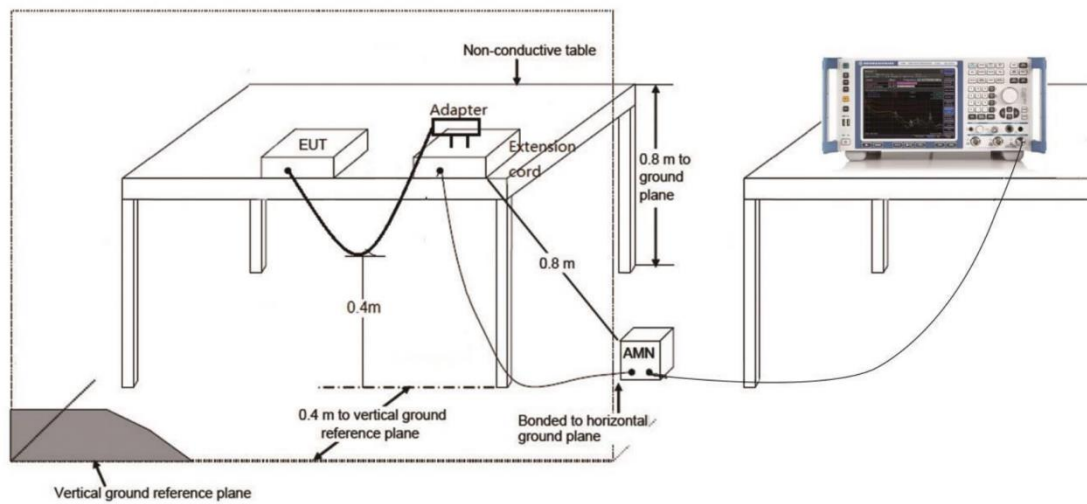
Measurement Uncertainty:

Measurement Uncertainty	1.97dB (k=2)
-------------------------	--------------

Chongqing Academy of Information and Communication Technology

Address: No. 8,Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China,401336
Tel: 0086-23-88069965 FAX:0086-23-88608777

Test Setup



Test

Condition

Voltage (V)	Frequency (Hz)
120	60

Measurement Results and limit:

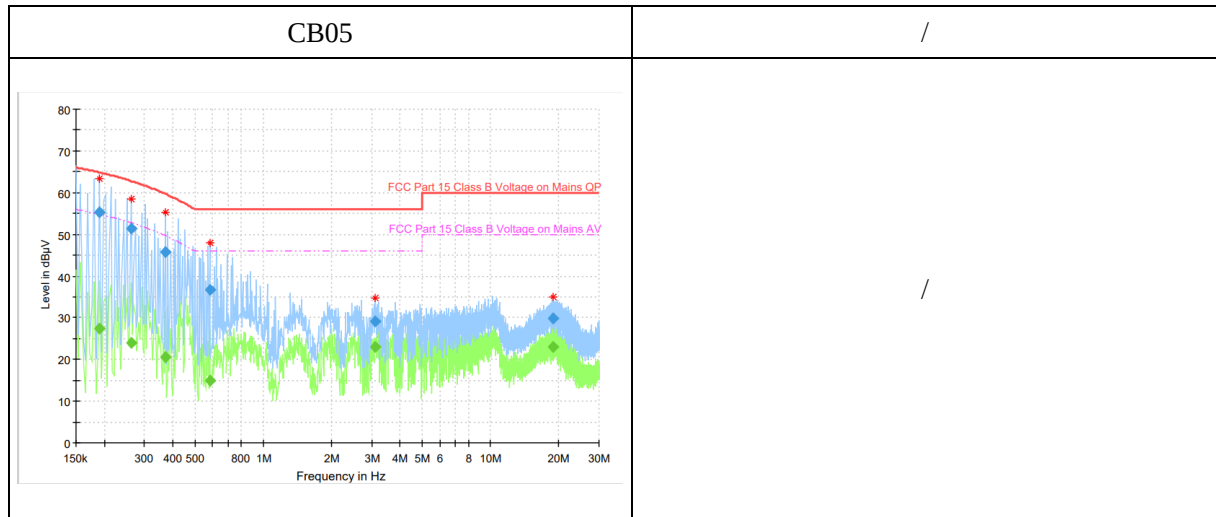
(Quasi-peak-average Limit)

Frequency range (MHz)	Quasi-peak Limit (dBμV)	Average Limit (dBμV)	Conclusion
0.15 to 0.5	66 to 56	56 to 46	P
0.5 to 5	56	46	
5 to 30	60	50	

NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

Chongqing Academy of Information and Communication Technology

Address: No. 8, Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China, 401336
Tel: 0086-23-88069965 FAX: 0086-23-88608777



Frequency (MHz)	QuasiPeak (dBμV)	Average (dμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.191044	55.39	---	64.83	9.44	15000.0	9.000	N	ON	10.5
0.191044	---	27.40	54.83	27.43	15000.0	9.000	N	ON	10.5
0.261938	---	24.09	52.80	28.71	15000.0	9.000	L1	ON	9.8
0.261938	51.32	---	62.80	11.48	15000.0	9.000	L1	ON	9.8
0.370144	---	20.59	49.71	29.12	15000.0	9.000	N	ON	10.5
0.370144	45.81	---	59.71	13.90	15000.0	9.000	N	ON	10.5
0.582825	36.64	---	56.00	19.36	15000.0	9.000	N	ON	10.5
0.582825	---	14.86	46.00	31.14	15000.0	9.000	N	ON	10.5
3.101419	29.15	---	56.00	26.85	15000.0	9.000	N	ON	10.7
3.101419	---	23.11	46.00	22.89	15000.0	9.000	N	ON	10.7
18.795056	29.86	---	60.00	30.14	15000.0	9.000	L1	ON	13.5
18.795056	---	22.94	50.00	27.06	15000.0	9.000	L1	ON	13.5

Chongqing Academy of Information and Communication Technology

Address: No. 8, Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China, 401336
 Tel: 0086-23-88069965 FAX: 0086-23-88608777



Report No.: I23W00054-BLE RF

ANNEX A EUT Photos

See the document” I23W00054-External Photos”.

See the document” I23W00054-Internal Photos”.

Chongqing Academy of Information and Communication Technology

Address: No. 8, Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China, 401336
Tel: 0086-23-88069965 FAX: 0086-23-88608777



Report No.: I23W00054-BLE RF

ANNEX B Deviations from Prescribed Test Methods

No deviation from Prescribed Test Methods.

*****END OF REPORT*****

Chongqing Academy of Information and Communication Technology

Address: No. 8, Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China, 401336
Tel: 0086-23-88069965 FAX: 0086-23-88608777