TEST REPORT

REPORT NUMBER: I21W00040-BLE_Rev2

ON

Type of Equipment:	Wireless communication module
Model name:	SNM900
Brand Name：	MEIGLink
Manufacturer:	MeiG Smart Technology Co., Ltd
FCC ID:	2APJ4-SNM900

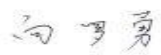
ACCORDING TO

FCC Part 15, Subpart C:
15.205 Restricted bands of operation,
15.209 Radiated emission limits; general requirements,
15.247 Operation within the bands 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz
ANSI C63.10-2013:American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

Chongqing Academy of Information and Communications Technology

Month date, year
Dec 27, 2021

Signature



Xiang Luoyong
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.

Revision Version

Report Number	Revision	Date	Memo
I21W00040-BLE	00	2021-12-17	Initial creation of test report
I21W00040-BLE_Rev1	01	2021-12-23	Second creation of test report
I21W00040-BLE_Rev2	02	2021-12-27	Third creation of test report

CONTENTS

1. Test Laboratory

1.1. Testing Location

Name:	Chongqing Academy of Information and Communications Technology
FCC Registration Number:	CN1239
Address:	Building C, Technology Innovation Center, No.8, Yuma Road, Chayuan New Area, Nan'an District, Chongqing, People's Republic of China
	No.19 East Road, Xiantao Big-data Valley, Yubei District, Chongqing, People's Republic of China
Postal Code:	401336
Telephone:	0086-23-88069965
Fax:	0086-23-88608777

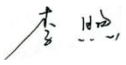
1.2. Testing Environment

Normal Temperature:	15-35℃
Relative Humidity:	30-60%

1.3. Project data

Testing Start Date:	2021-11-08
Testing End Date:	2021-12-16

1.4. Signature

	2021-12-27
LiXu **(Prepared this test report)**	**Date**
	2021-12-27
ChenWen **(Reviewed this test report)**	**Date**
	2021-12-27
XiangLuoYong **Director of the laboratory** **(Approved this test report)**	**Date**

2. Client Information

2.1. Applicant Information

Company Name:	MeiG Smart Technology Co., Ltd
Address /Post:	Floor 2, No.5 Office Building, Lingxia Road, Fenghuang Community, Fuyong Street, Bao 'an District, Shenzhen
City:	Shenzhen
Country:	China
Telephone:	021-54278676
Fax:	--
Email:	louxinwei@meigsmart.com
Contact Person:	louxinwei

2.2. Manufacturer Information

Company Name:	--
Address /Post:	--
City:	--
Country:	--
Telephone:	--
Fax:	--
Email:	--
Contact Person:	--

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

3.1. About EUT

EUT Description	Wireless communication module
Model name	SNM900
Brand name	MEIGLink
BLUETOOTH Frequency	2402MHz-2480MHz
Antenna description	External Antenna/PIFA Antenna
Antenna Gain	5.84dBi/2.68dBi
Extreme Temperature	-40/+75℃
Nominal Voltage	3.8
Extreme High Voltage	4.2
Extreme Low Voltage	3.5

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

3.2. Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version	Date of receipt
S5	865171050693608	SLM900_MB_V1.01_PCB	SNM900Q_EQ000_2774.DCF921C.0452224_201104_100_V01_T04	2021-10-27
S3	865171050693269	SLM900_MB_V1.01_PCB	SNM900Q_EQ000_2774.DCF921C.0452224_201104_100_V01_T04	2021-10-27
S2	M900332GYA111300009	SLM900_MB_V1.01_PCB	SNM900Q_EQ000_2774.DCF921C.0452224_201104_100_V01_T04	2021-12-06

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

3.3. Outline of Equipment under Test

The SNM900, referred to as “EUT” hereafter, is a a multi-Band Wireless communication module operating on the Wi-Fi/BLUETOOTH networks. The table below shows the supported bands for the EUT.

Technology	Band	UL Freq.(MHz)	DL Freq.(MHz)	Note
BLUETOOTH	--	2402-2480		--

3.4. Internal Identification of AE used during the test

AE ID*	Description	Gain（dB）*
AE1	RF cable	--
AE2	Antenna 1	5.84
AE3	Antenna 2	2.68

Note:Only Antenna 1 radiation method test data record report.
*AE ID: is used to identify the test sample in the lab internally.
dB*：is provided customer.

3.5. Antenna Requirement

Standard Applicable

For intentional device, according to FCC 47 CFR 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 .

Refer to statement below for compliance .

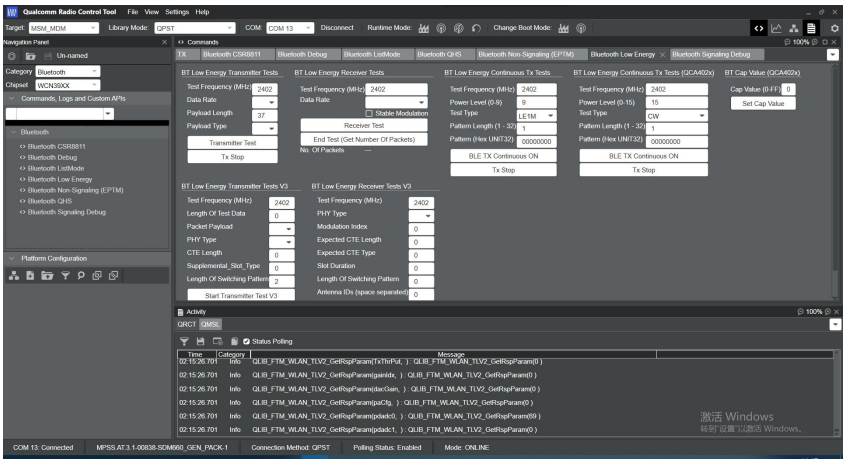
The manufacturer may design the unit so that the user can replace a broken antenna , but the use of a standard antenna jack or electrical connector is prohibited . Further , this requirement does not apply to intentional radiators that must be professionally installed.

Antenna Connected Construction

The antenna used in this product is a External Antenna and PIFA Antenna . It conforms to the standard requirements. The directional gains of External antenna used for transmitting is 5.84dBi,The directional gains of PIFA Antenna used for transmitting is 2.68dBi.

3.6. EUT Test RF Confagle Configuration

Set DUT power, rate and channel through at command, and set the power level to 9.


Qualcomm Radio Control Tool
File View Settings Help
Target: MSM_MDM
Library Mode: QPST
COM: COM 13
Disconnect
Runtime Mode:
Change Boot Mode:
Navigation Panel
Un-named
Category Bluetooth
Chipset WCN3990
Commands, Logs and Custom APIs
Bluetooth
Bluetooth CSR8811
Bluetooth Debug
Bluetooth ListMode
Bluetooth Low Energy
Bluetooth Non-Signaling (EPTM)
Bluetooth QHS
Bluetooth Signaling Debug
Platform Configuration
Commands
TX
Bluetooth CSR8811
Bluetooth Debug
Bluetooth ListMode
Bluetooth QHS
Bluetooth Non-Signaling (EPTM)
Bluetooth Low Energy
Bluetooth Signaling Debug
BT Low Energy Transmitter Tests
Test Frequency (MHz) 2402
Data Rate
Payload Length 37
Payload Type
Transmitter Test
Tx Stop
BT Low Energy Receiver Tests
Test Frequency (MHz) 2402
Data Rate
Stable Modulation
Receiver Test
End Test (Get Number Of Packets)
No. Of Packets
BT Low Energy Continuous Tx Tests
Test Frequency (MHz) 2402
Power Level (0-9) 9
Test Type LE1M
Pattern Length (1 - 32) 1
Pattern (Hex UNIT32) 00000000
BLE TX Continuous ON
Tx Stop
BT Low Energy Continuous Tx Tests (QCA402x)
Test Frequency (MHz) 2402
Power Level (0-15) 15
Test Type CW
Pattern Length (1 - 32) 1
Pattern (Hex UNIT32) 00000000
BLE TX Continuous ON
Tx Stop
BT Cap Value (QCA402x)
Cap Value (0-FF) 0
Set Cap Value
BT Low Energy Transmitter Tests V3
Test Frequency (MHz) 2402
Length Of Test Data 0
Packet Payload
PHY Type
CTE Length 0
Supplemental_Slot_Type 0
Length Of Switching Pattern 2
Start Transmitter Test V3
BT Low Energy Receiver Tests V3
Test Frequency (MHz) 2402
PHY Type
Modulation Index 0
Expected CTE Length 0
Expected CTE Type 0
Slot Duration 0
Length Of Switching Pattern 0
Antenna IDs (space separated) 0
Activity
QRCT QMSL
Status Polling
Time Category Message
02:15:26.701 Info QLIB_FTM_WLAN_TLV2_GetRspParam(TxThrPut,) : QLIB_FTM_WLAN_TLV2_GetRspParam(0)
02:15:26.701 Info QLIB_FTM_WLAN_TLV2_GetRspParam(gainIdx,) : QLIB_FTM_WLAN_TLV2_GetRspParam(0)
02:15:26.701 Info QLIB_FTM_WLAN_TLV2_GetRspParam(dacGain,) : QLIB_FTM_WLAN_TLV2_GetRspParam(0)
02:15:26.701 Info QLIB_FTM_WLAN_TLV2_GetRspParam(paCfg,) : QLIB_FTM_WLAN_TLV2_GetRspParam(0)
02:15:26.701 Info QLIB_FTM_WLAN_TLV2_GetRspParam(pdadc0,) : QLIB_FTM_WLAN_TLV2_GetRspParam(69)
02:15:26.701 Info QLIB_FTM_WLAN_TLV2_GetRspParam(pdadc1,) : QLIB_FTM_WLAN_TLV2_GetRspParam(0)
激活 Windows
转到"设置"以激活 Windows。
COM 13: Connected
MPSS.AT.3.1-00838-SDM660_GEN_PACK-1
Connection Method: QPST
Polling Status: Enabled
Mode: ONLINE

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	Year number
FCC Part 15, Subpart C, 2020	Intentional Radiators	2020
ANSI C63.10-2013	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices	2013

5. Test Equipments Utilized

5.1. RF Test System

No.	Equipment	Model	SN	HW Version	SW Version	Manufacture	Cal. Date	Cal.Due Date
1	spectrum analyzer	FSQ 26	201137/026	--	--	R&S	2021-05-12	2022-06-11
2	power sensor	NPR8S	102336	--	--	R&S	2021-05-12	2022-06-11
3	DC Power Supply	N6705B	MY50000919	--	--	Agilent	2021-05-12	2022-06-11

5.2. RSE Test System

No.	Equipment	Model	SN	HW Version	SW Version	Manufacture	Cal. Date	Cal.Due Date
1	Test Receiver	ESU40	100350	01	4.43 SP3	R&S	2021-05-12	2022-06-11
2	Ultra-wideband Log Periodic Antenna	VULB 9163	9163-586	--	--	Schwarzbeck	2020-10-12	2022-11-11
3	Double Ridged Guide Antenna	9120D	9120D-1083	--	--	Schwarzbeck	2021-05-12	2022-06-11
4	Test Receiver	ESW 26	101382	00	1.50 SP1	R&S	2021-05-12	2022-06-11
5	Horn Antenna	DATE 1152	LM7127	--	--	ETS	2020-07-17	2022-08-16
6	Test Receiver	ESR 3	102477	03	3.48 SP2	R&S	2021-05-12	2022-06-11
7	Artificial Main Network	ENV 216	102368	--	--	R&S	2021-05-12	2022-06-11
8	Loop Antenna	6502	00143163	--	--	ETS	2020-07-16	2022-08-15

5.3. Climate Chamber

No.	Name	Type	SN	Manufacture	Cal. Date	Cal.Due Date
1	Climate chamber	SH-241	92010759	ESPEC	2021-05-12	2022-06-11
2	Fully anechoic chamber	FAC-5	--	TDK	2020-07-31	2024-08-30
3	Semi-anechoic chamber	FAC-10	--	TDK	2020-07-29	2024-08-28

5.4. Vibration table

No.	Name	version	SN	Manufacture	No.
--	--	--	--	--	--

Anechoic chamber

Fully anechoic chamber by TDK.

5.5. Test software

No.	Name	version	SN	Manufacture
1	EMC32	V 9.26.01	--	R&S
2	EMC32	V10.20.10	--	R&S

6. Summary of Test Results

A brief summary of the tests carried out is shown as following.

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(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	Power line Conducted Emissions	Pass
Note:--		

7 Test Results

7.1 Maximum Peak Output Power

Specifications:	FCC Part 15.247(b)
DUT Serial Number:	865171050693608
Test conditions:	Ambient Temperature:15℃-35℃ Relative Humidity:30%-60% Air pressure: 86-106kPa
Test Results:	Pass

Limit Level Construction:

The maximum peak output power of the intentional radiator shall not exceed the following:

1. For systems using digital modulation in the bands of 902 - 928 MHz, 2400 - 2483.5 MHz, and 5725 - 5850 MHz: 1 watt.

2. Except as shown in paragraphs (b)(3) (i), (ii) and (iii) of this section, if transmitting antennas of directional gain greater than 6 dBi are used the peak output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1) or (b)(2) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Measurement Uncertainty:

Measurement Uncertainty	±1.0dB

The measurement is according to ANSI C63.10 clause 11.9.1.3

Test Method:

1) The RF output of EUT was connected to the RF power meter by RF cable and 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) Measure the conducted output power and record the results in the test report.

Note: --

Measurement Results:

	Channel No.	Output Power (dBm)	Result
1 M	Low: 0	0.01	Pass
	Middle: 19	0.56	Pass
	High: 39	1.03	Pass
2 M	Low: 0	0.05	Pass
	Middle: 19	0.43	Pass
	High: 39	0.93	Pass

	Channel No.	EIRP(dBm)
1 M	Low: 0	5.85
	Middle: 19	6.40
	High: 39	6.87
2 M	Low: 0	5.89
	Middle: 19	6.27
	High: 39	6.77

Conclusion: PASS

7.2 Peak Power Spectral Density

Specifications:	FCC CFR Part 15.247(e)
DUT Serial Number:	865171050693608
Test conditions:	Ambient Temperature:15℃-35℃ Relative Humidity:30%-60% Air pressure: 86-106kPa
Test Results:	Pass

Limit Level Construction:

Standard	Limit
FCC CFR Part 15.247(e)	< 8dBm/3 KHz

Measurement Uncertainty:

Measurement Uncertainty	±0.82dBm/KHz

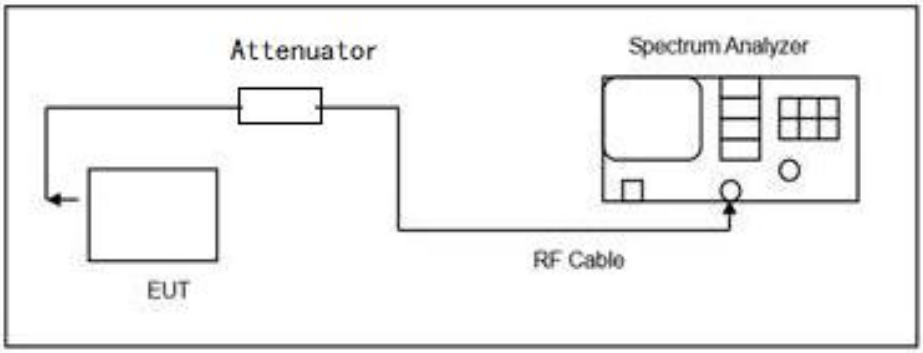
Test procedure:

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 kHz ≤ RBW ≤ 100 kHz.
6. Set the VBW ≥ [3 × 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.

Note: --

Test block diagram:



Test Results:

1 M	**Power Spectral Density(dBm/3kHz)**			**Conclusion**
	Ch0	**Ch19**	**Ch39**	
	-15.22	-14.67	-14.22	Pass
	Power Spectral Density(dBm/100kHz)			**Conclusion**
	Ch0	**Ch19**	**Ch39**	
	0.00	0.63	1.10	Pass

2 M	**Power Spectral Density(dBm/3kHz)**			**Conclusion**
	Ch0	**Ch19**	**Ch39**	
	-17.86	-17.34	-16.87	Pass
	Power Spectral Density(dBm/100kHz)			**Conclusion**
	Ch0	**Ch19**	**Ch39**	
	-0.09	0.47	0.94	Pass

Conclusion: PASS

Test figure as below:

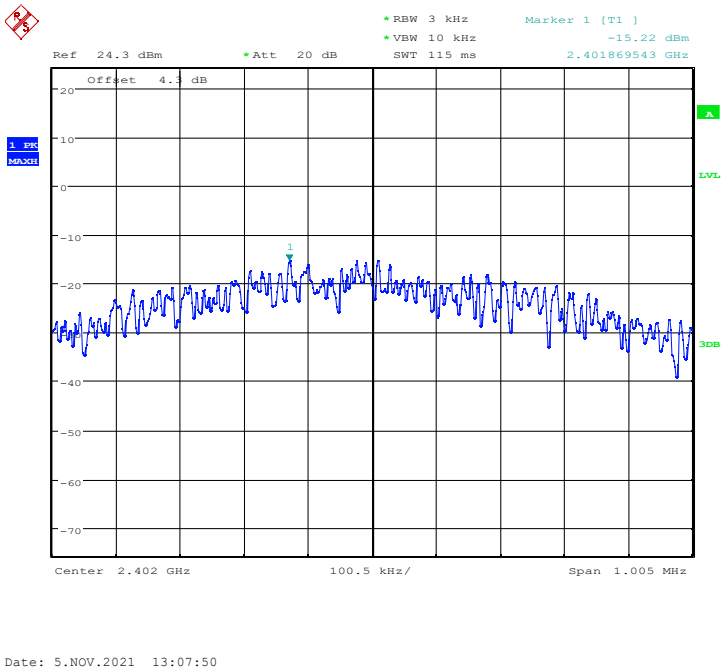


Fig.1 Power spectral density: 1M CH0 PSD/3KHz

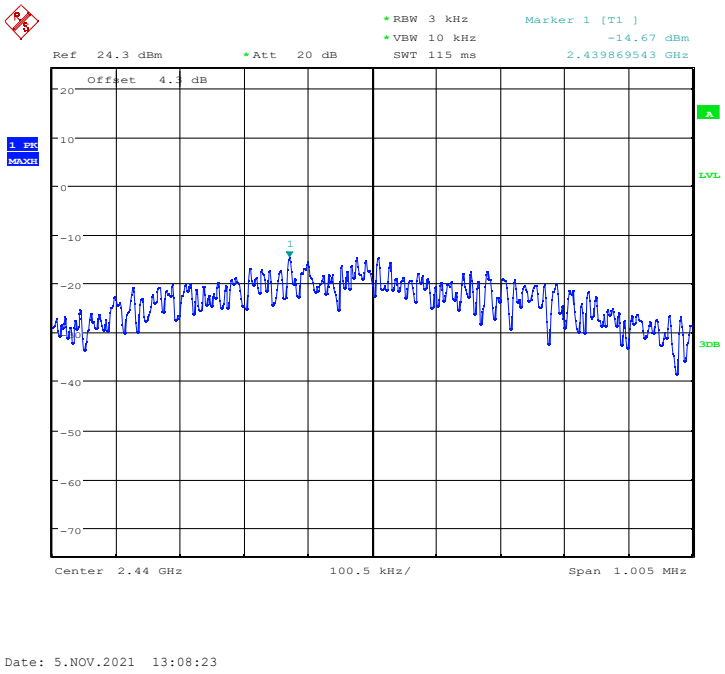


Fig.2 Power spectral density: 1M CH19 PSD/3KHz

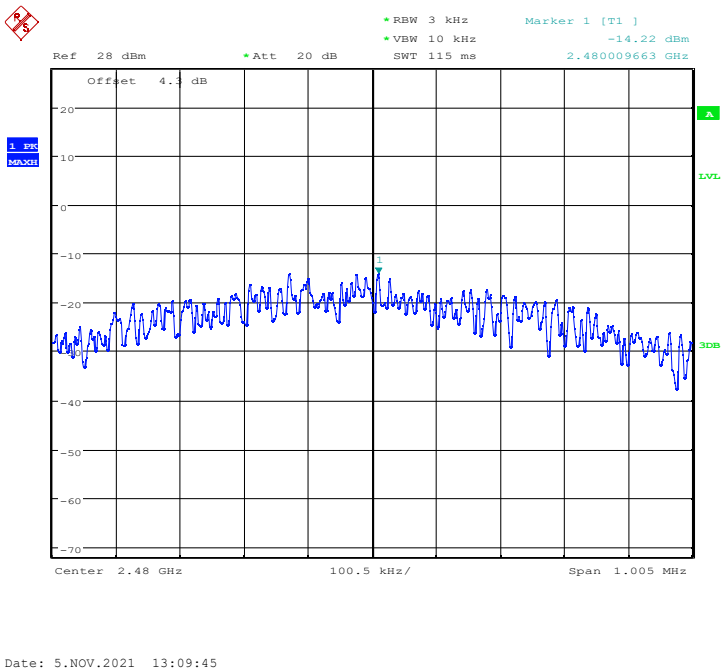


Fig.3 Power spectral density: 1M CH39 PSD/3KHz

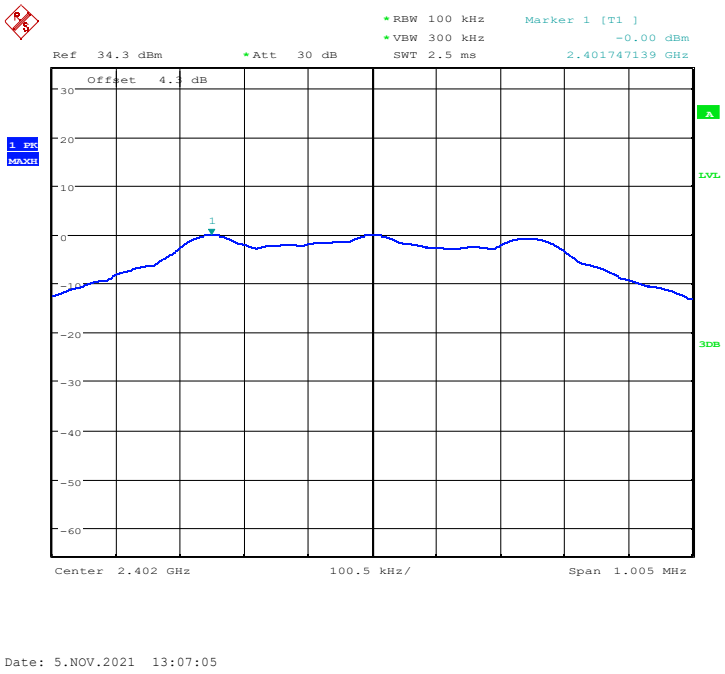


Fig.4 Power spectral density: 1M CH0 PSD/100KHz

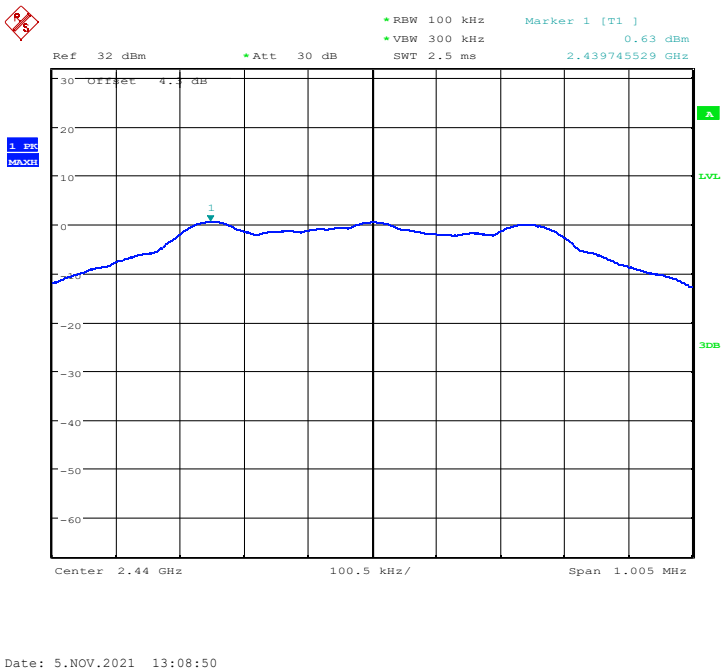


Fig.5 Power spectral density: 1M CH19 PSD/100KHz

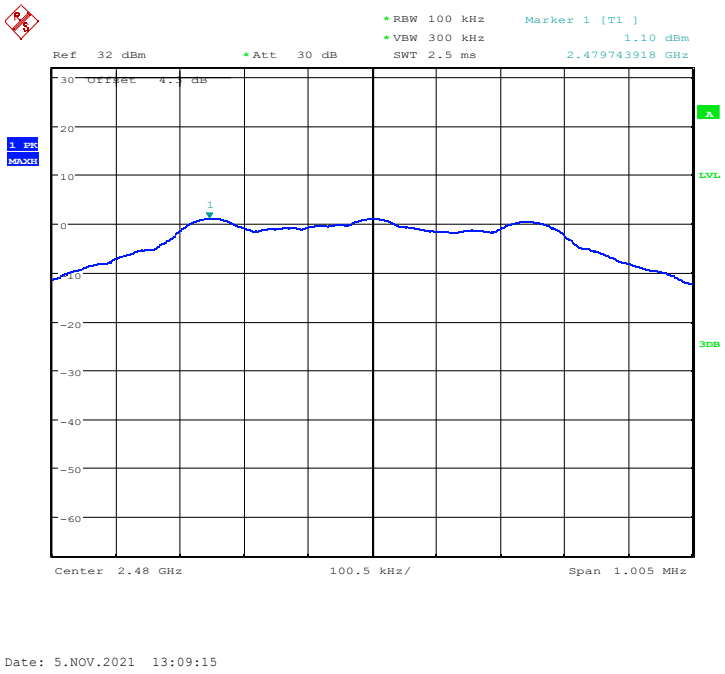


Fig.6 Power spectral density: 1M CH39 PSD/100KHz

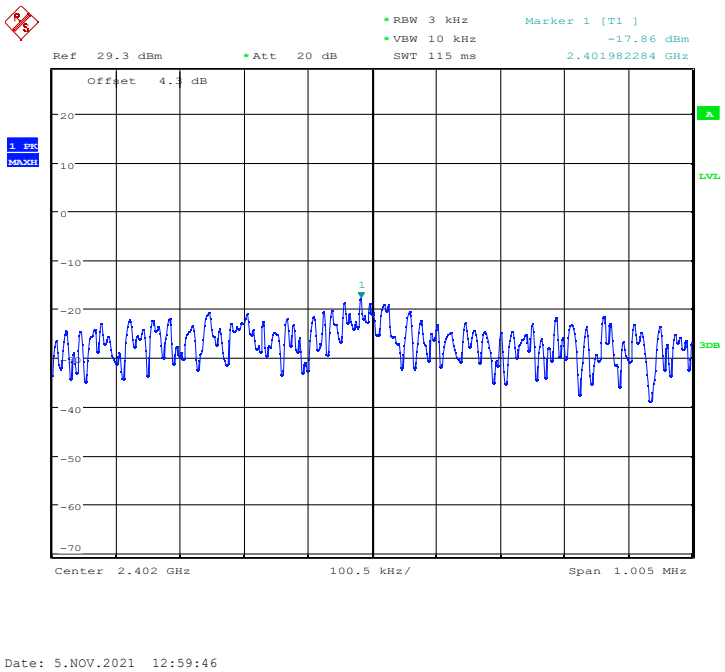


Fig.7 Power spectral density: 2M CH0 PSD/3KHz

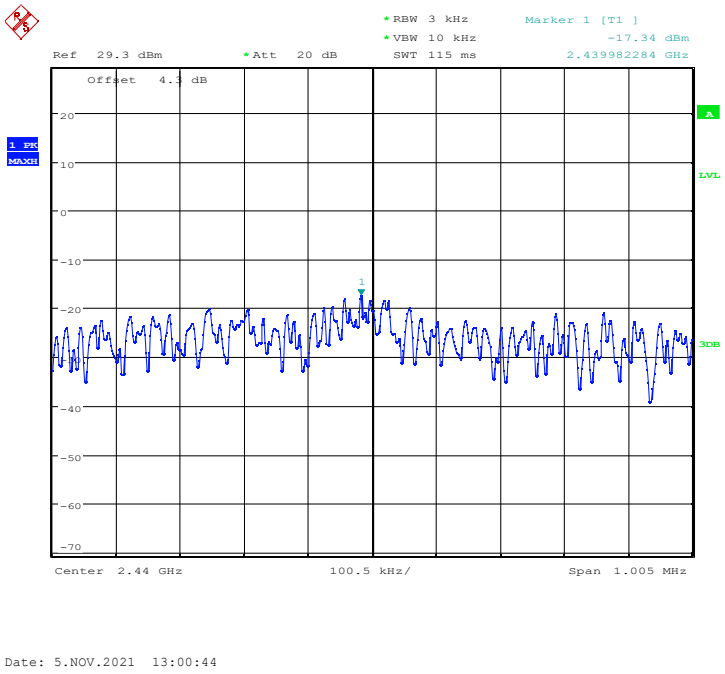


Fig.8 Power spectral density: 2M CH19 PSD/3KHz

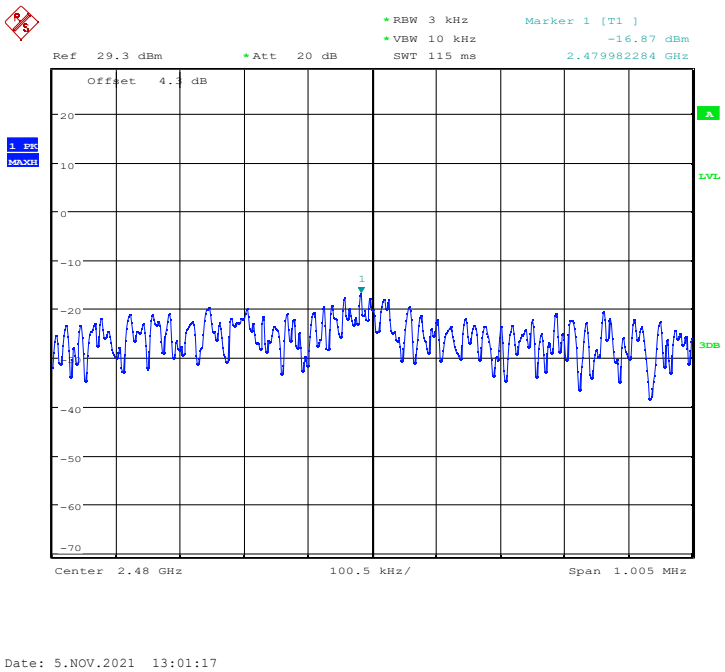


Fig.9 Power spectral density: 2M CH39 PSD/3KHz

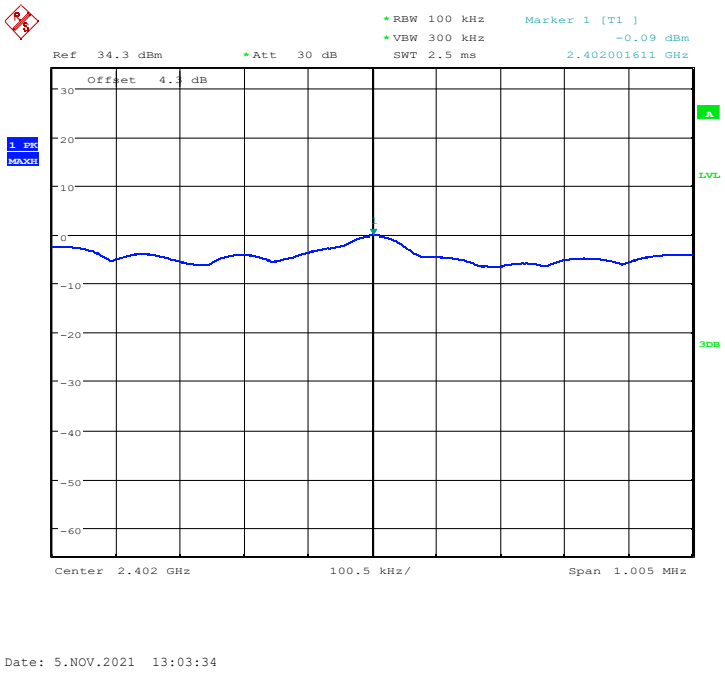


Fig.10 Power spectral density: 2M CH0 PSD/100KHz

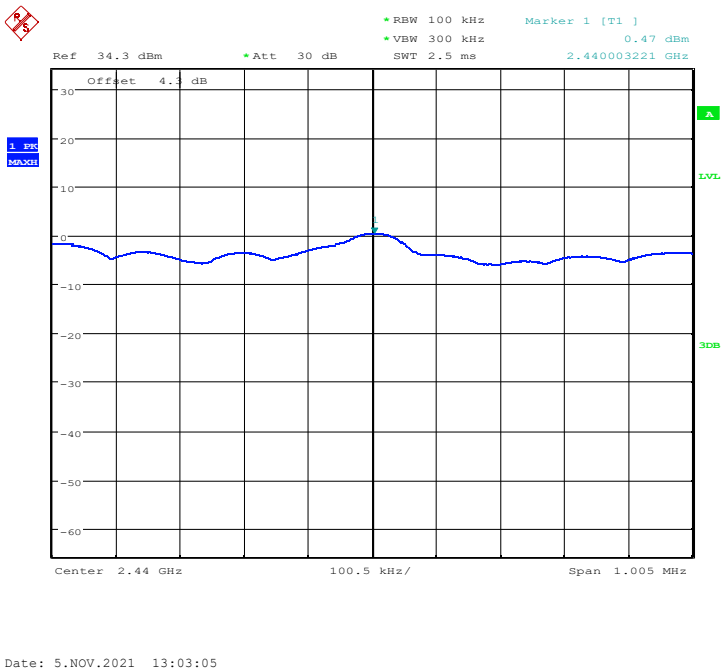


Fig.11 Power spectral density: 2M CH19 PSD/100KHz

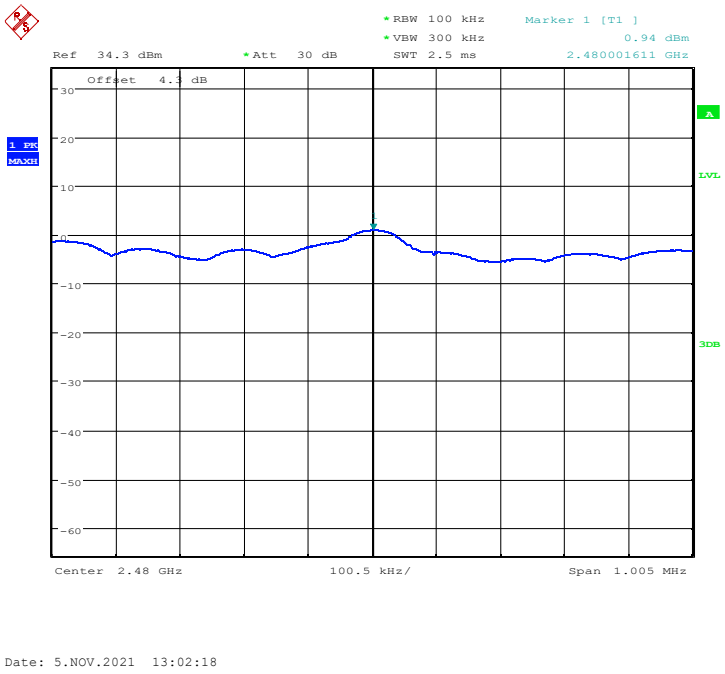


Fig.12 Power spectral density: 2M CH39 PSD/100KHz

7.3 6dB Occupied Bandwidth

Specifications:	FCC 47 CFR Part 15.247(a)
DUT Serial Number:	865171050693608
Test conditions:	Ambient Temperature:15℃-35℃ Relative Humidity:30%-60% Air pressure: 86-106kPa
Test Results:	Pass

Limit Level Construction:

Standard	Limit(KHz)
FCC 47 CFR Part 15.247(a)	≥500

Measurement Uncertainty:

Measurement Uncertainty	±1.1KHz

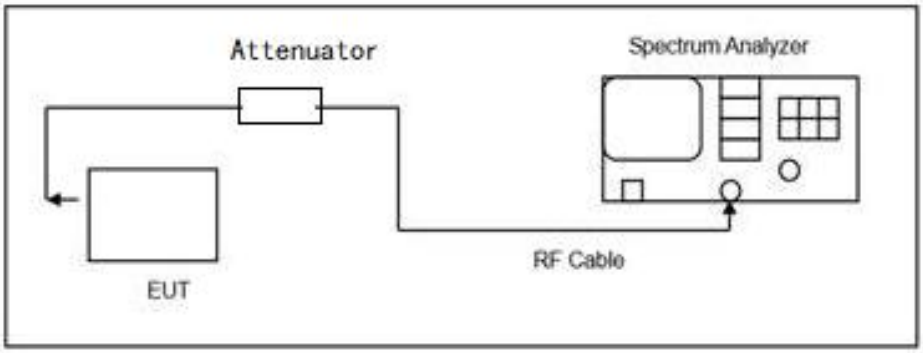
Test Procedure

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 ≥ [3 × 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.

Note: --

Test block diagram:



Test Result:

1M	Occupied 6dB Bandwidth(MHz)			Conclusion
	Ch0	Ch19	Ch39	
	0.669	0.666	0.669	Pass

2M	Occupied 6dB Bandwidth(MHz)			Conclusion
	Ch0	Ch19	Ch39	
	0.756	0.762	0.756	Pass

Conclusion: PASS

Test figure as below:

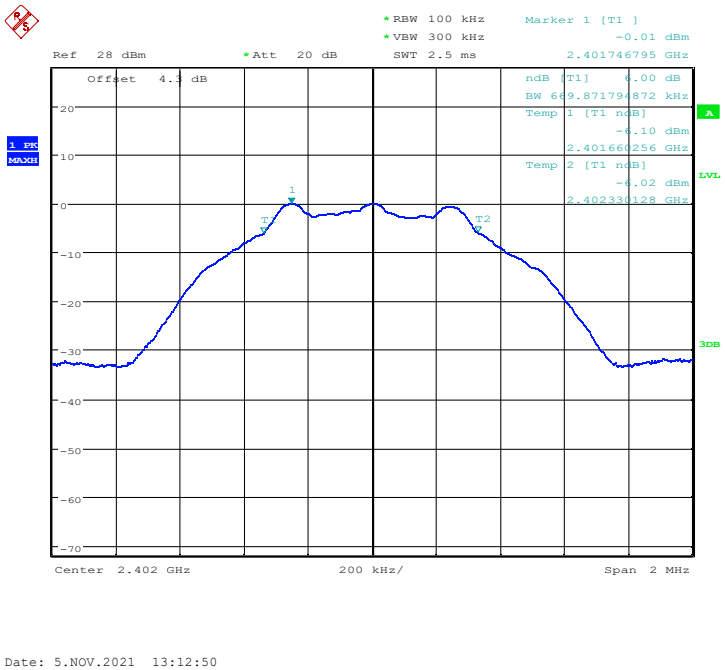


Fig.13 6dB Bandwidth: 1M Ch0

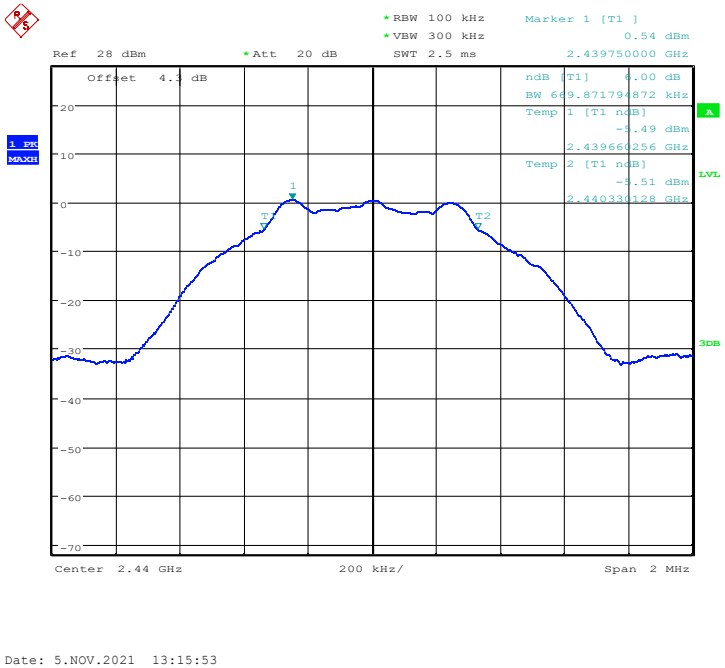


Fig.14 6dB Bandwidth: 1M Ch19

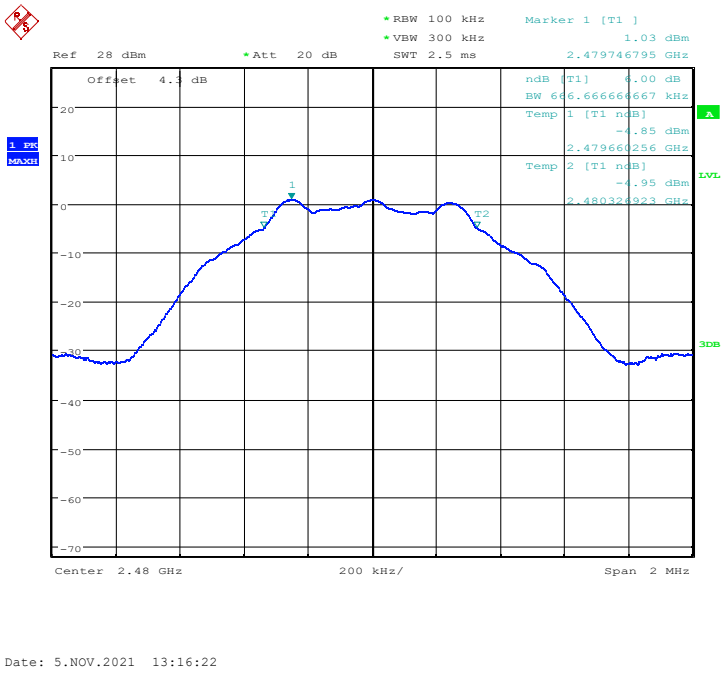


Fig.15 6dB Bandwidth: 1M Ch39

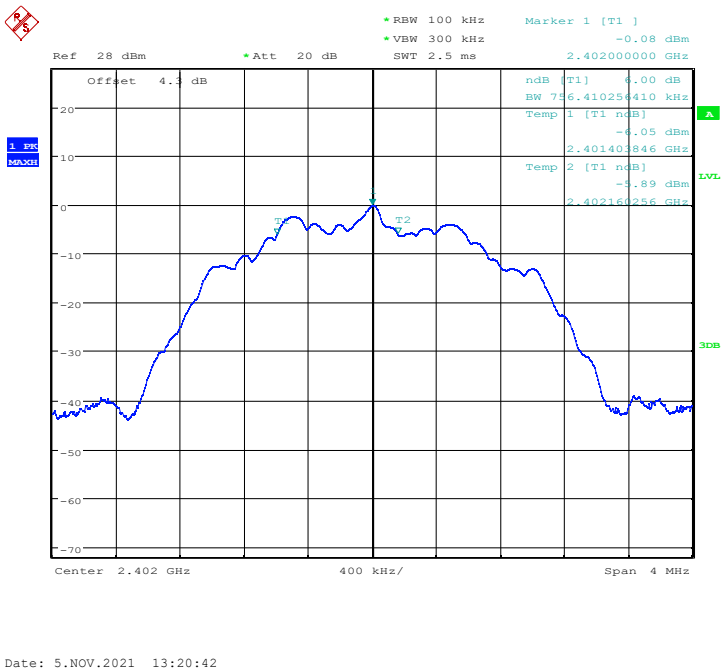


Fig.16 6dB Bandwidth: 2M Ch0

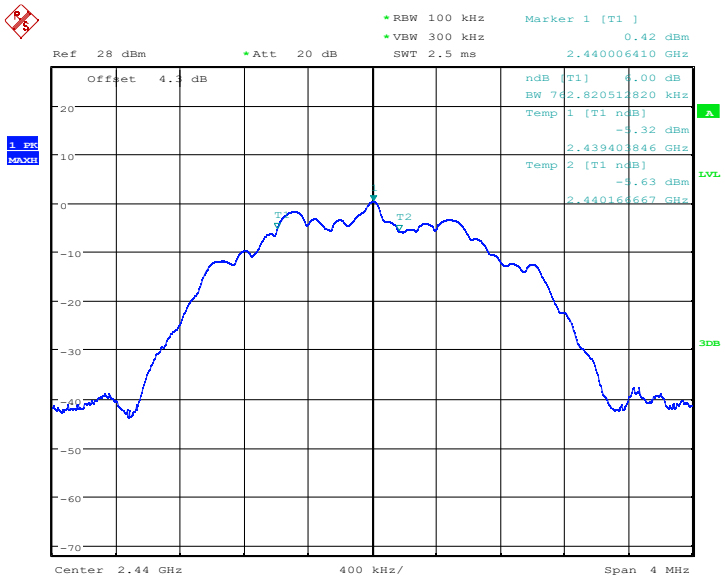


Fig.17 6dB Bandwidth: 2M Ch19

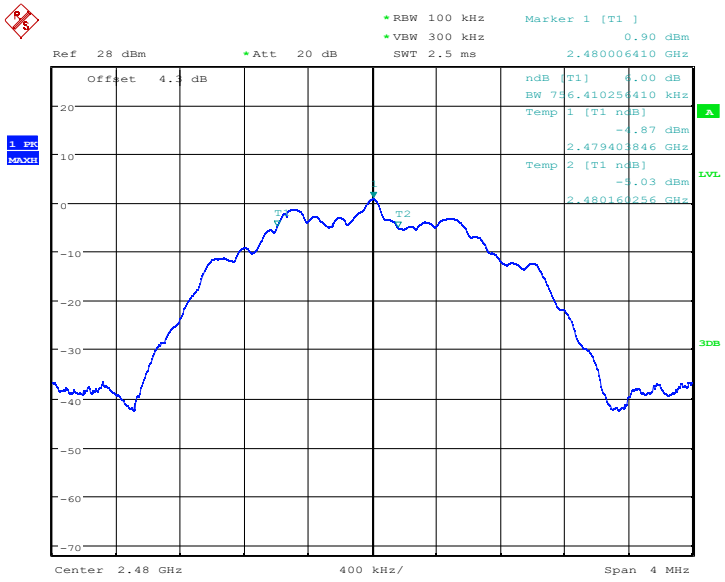


Fig.18 6dB Bandwidth: 2M Ch39

7.4 Band Edges Compliance

Specifications:	FCC 47 CFR Part 15.247(d)
DUT Serial Number:	865171050693608、865171050693269
Test conditions:	Ambient Temperature:15℃-35℃ Relative Humidity:30%-60% Air pressure: 86-106kPa
Test Results:	Pass

Limit Level Construction:

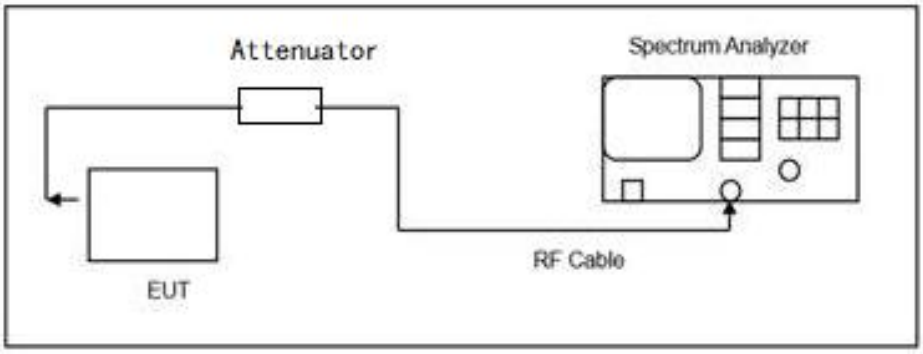
According to §15.247(d), in any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

Measurement Uncertainty:

Measurement Uncertainty	±1.0dB

The computer is used to set the transmission channel and power level. The transmitter output is connected to the spectrum analyzer via an RF line

Test block diagram:



Test procedure:

The transmitter output is connected to the Spectrum Analyzer. The Spectrum Analyzer is set to the peak detector mode. The spectrum analyzer is set to:

1. Span = 10 MHz
2. RBW = 100 KHz
3. VBW = 300 KHz
4. Sweep = auto

The measurement is made according to Public notice FCC Public Notice DA 00-705, March 2000, and ANSI C63.4-2003.

Note: --

Test Result:

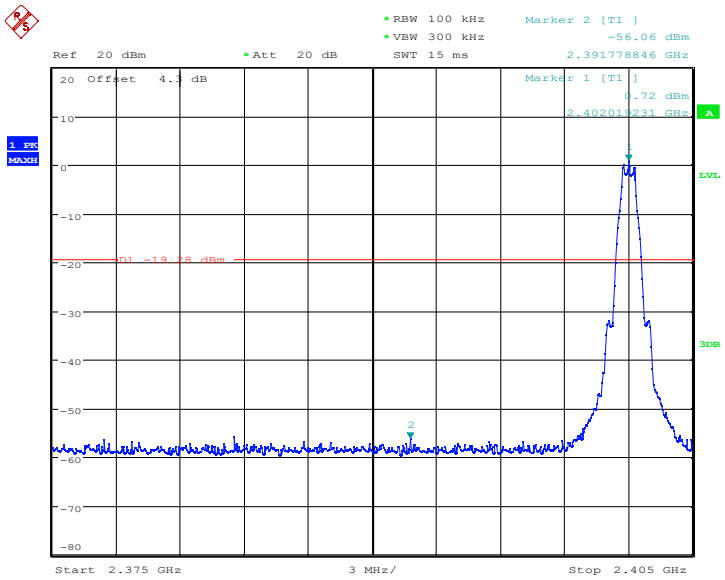


Fig.19 Frequency Band Edge: 1M Ch0

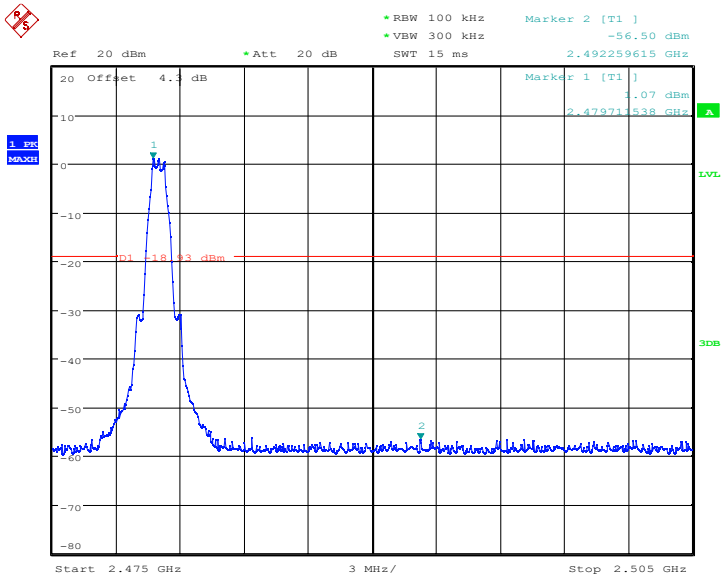


Fig.20 Frequency Band Edge: 1M Ch39

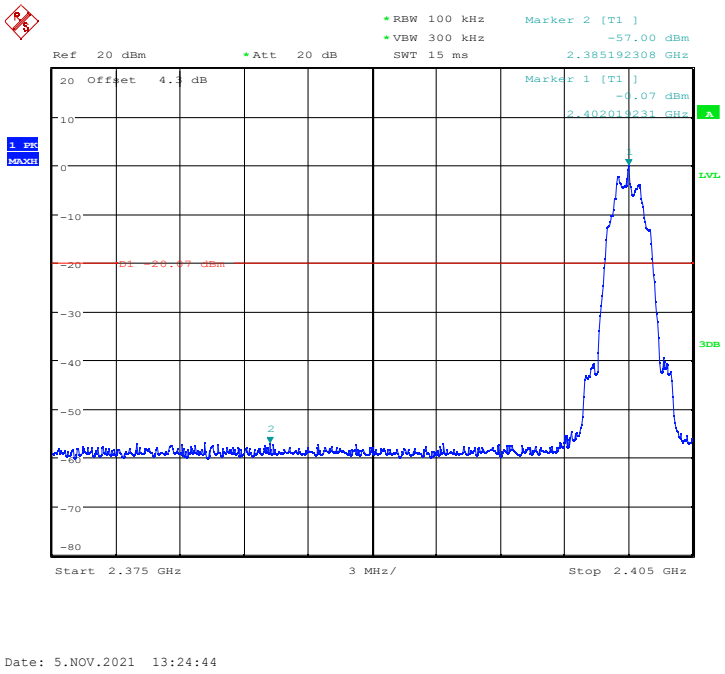


Fig.21 Frequency Band Edge: 2M Ch0

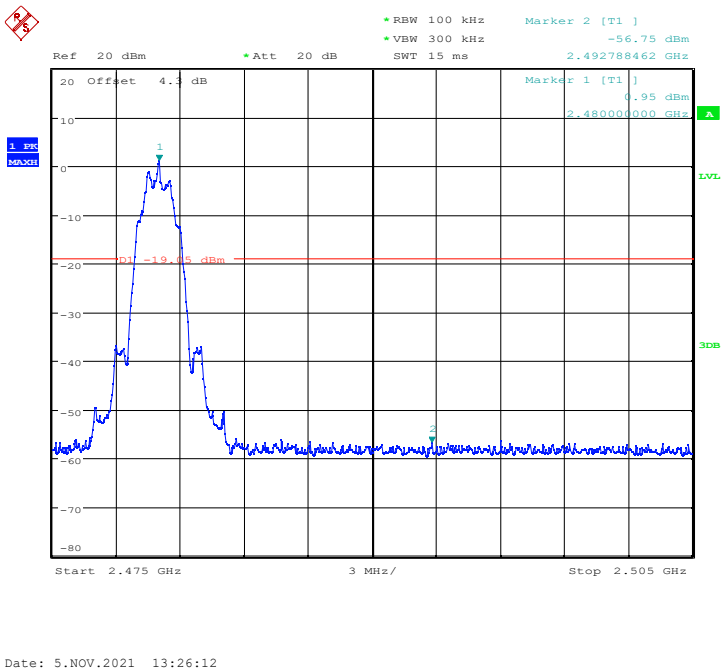


Fig.22 Frequency Band Edge: 2M Ch39

Conclusion: PASS

7.5 Transmitter Spurious Emission-Conducted

Specifications:	FCC 47 CFR Part15.247 (d)
DUT Serial Number:	865171050693608
Test conditions:	Ambient Temperature:15℃-35℃ Relative Humidity:30%-60% Air pressure: 86-106kPa
Test Results:	Pass

Limit

Standard	Limit
FCC 47 CFR Part15.247 (d)	20dB below peak output power in 100KHz bandwidth

Measurement Uncertainty:

Frequency Range	Uncertainty
30MHz ≤ f ≤ 26GHz	±2.7

Test Procedure

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 ≥ [3 × 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

12. Set the center frequency and span to encompass frequency range to be measured.

13. Set the RBW = 100 kHz.

14. Set the VBW ≥ [3 × RBW].

15. Detector = peak.

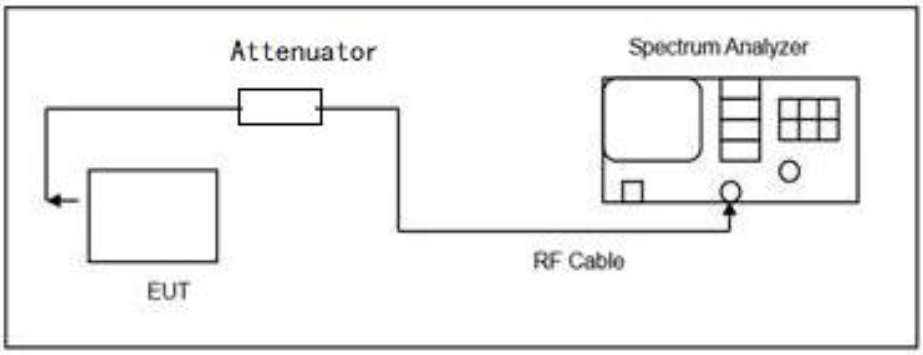
16. Sweep time = auto couple.

17. Trace mode = max hold.

18. Allow trace to fully stabilize.

19. Use the peak marker function to determine the maximum amplitude level.

Test block diagram:



Test Result:

	Channel	Frequency Range	Test Results	Conclusion
1M	0	30MHz~3GHz	Fig.23	Pass
		3GHz~26.5GHz	Fig.24	Pass
	19	30MHz~3GHz	Fig.25	Pass
		3GHz~26.5GHz	Fig.26	Pass
	39	30MHz~3GHz	Fig.27	Pass
		3GHz~26.5GHz	Fig.28	Pass

	Channel	Frequency Range	Test Results	Conclusion
2M	0	30MHz~3GHz	Fig.29	Pass
		3GHz~26.5GHz	Fig.30	Pass
	19	30MHz~3GHz	Fig.31	Pass
		3GHz~26.5GHz	Fig.32	Pass
	39	30MHz~3GHz	Fig.33	Pass
		3GHz~26.5GHz	Fig.34	Pass

Conclusion: PASS

Test figure as below:

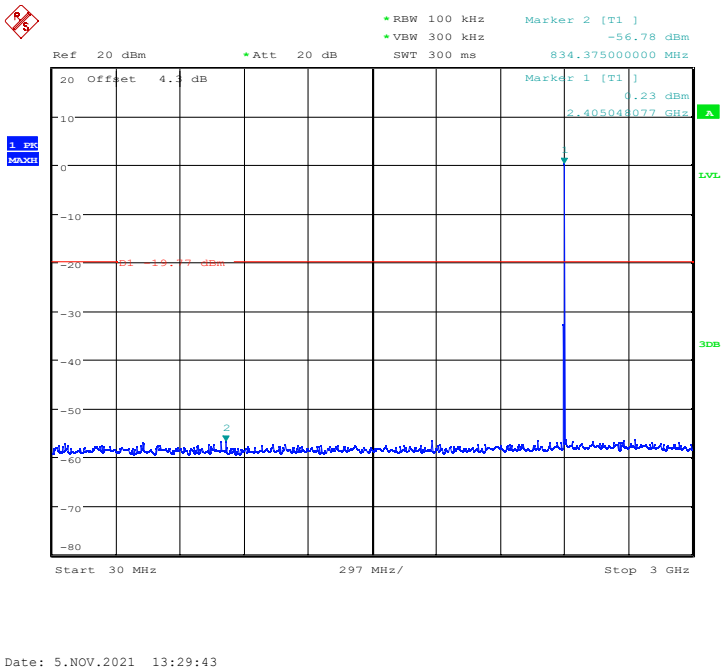


Fig.35 Conducted spurious emission: 1M Ch0, 30MHz~3GHz

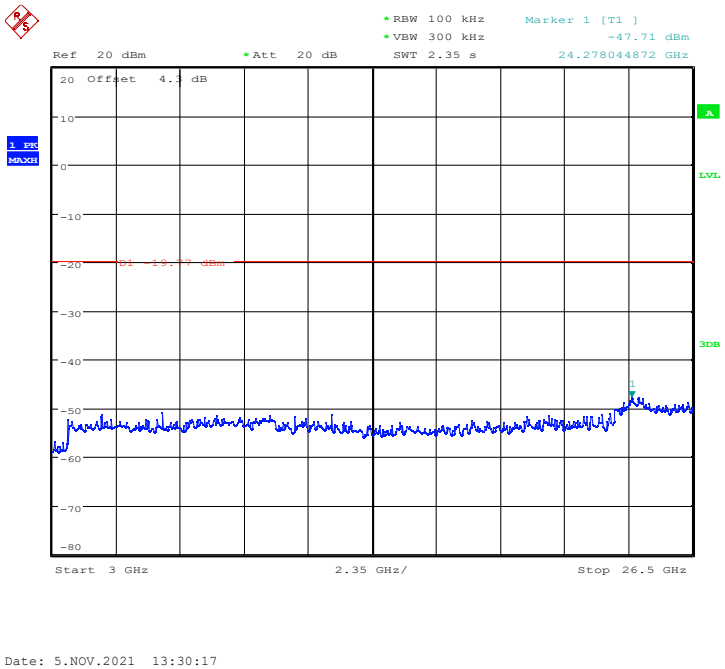


Fig.36 Conducted spurious emission: 1M Ch0, 3GHz~26.5GHz

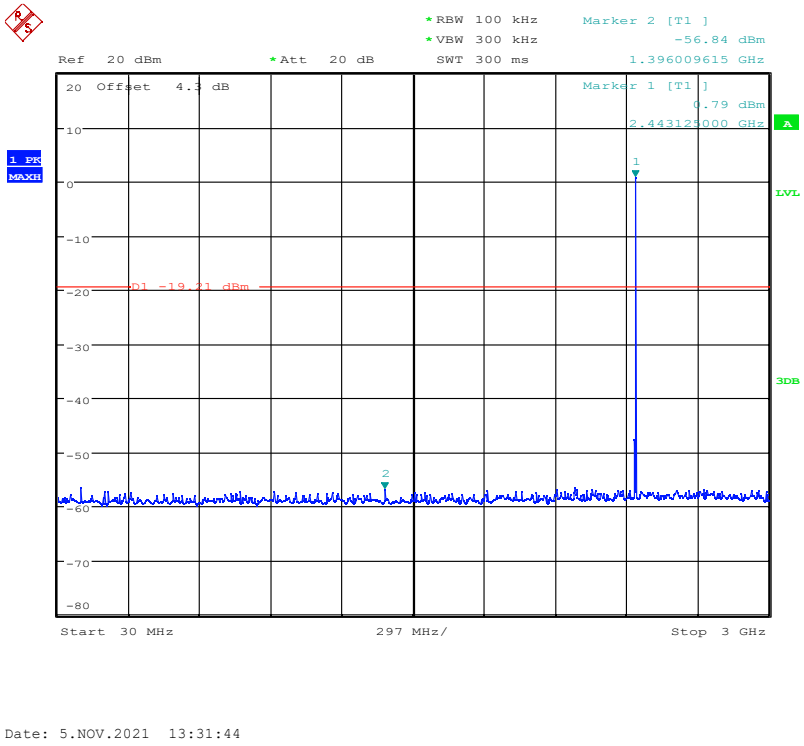


Fig.37 Conducted spurious emission: 1M Ch19, 30MHz~3GHz

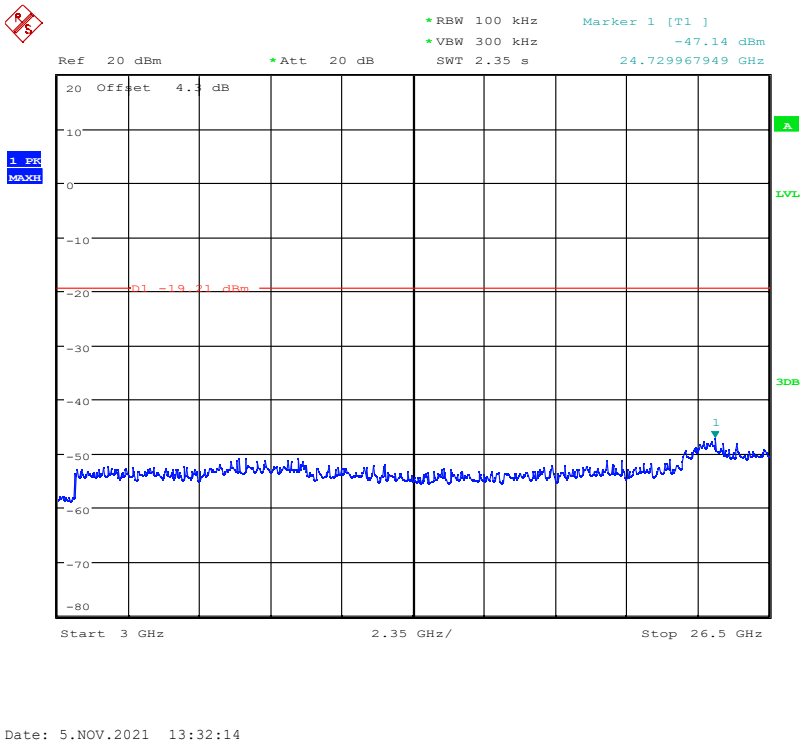


Fig.38 Conducted spurious emission: 1M Ch19, 3GHz~26.5GHz

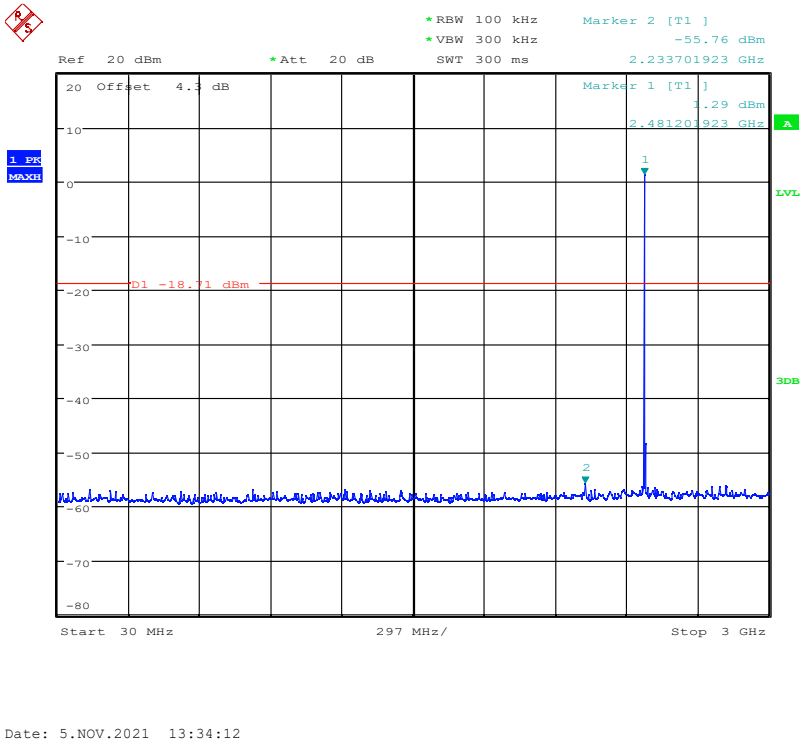


Fig.39 Conducted spurious emission: 1M Ch39, 30MHz~3GHz

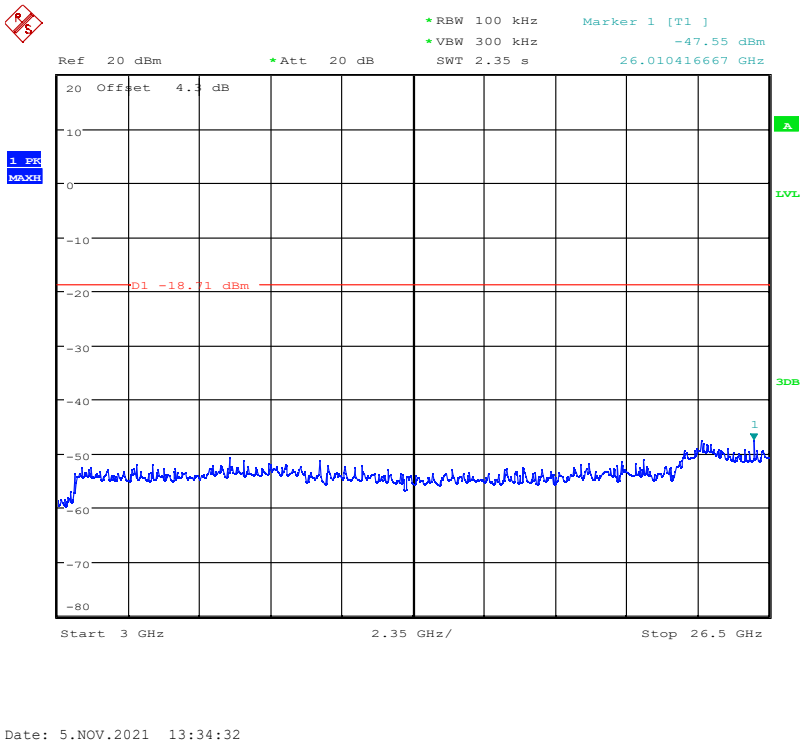


Fig.40 Conducted spurious emission: 1M Ch39, 3GHz~26.5GHz

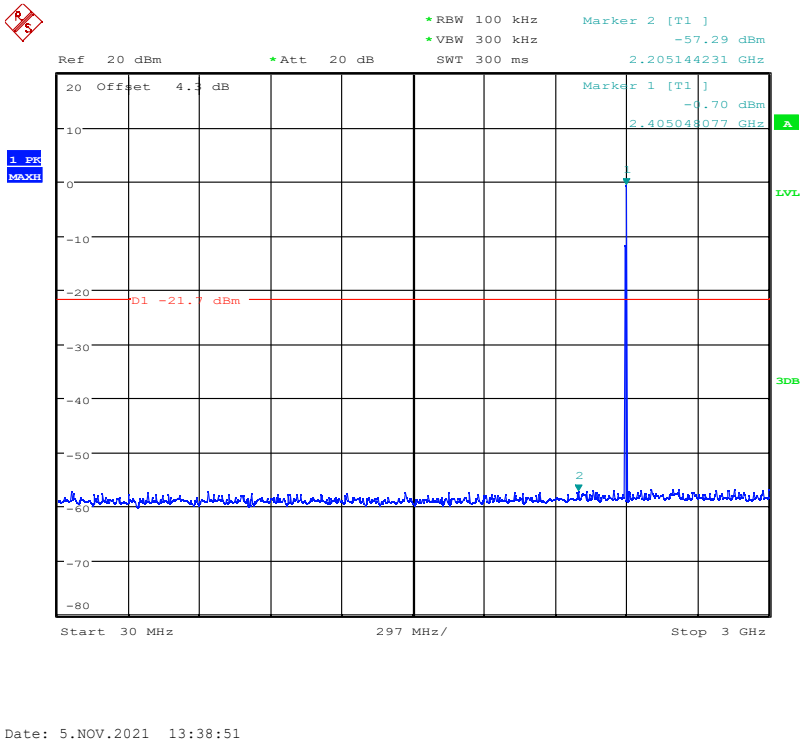


Fig.41 Conducted spurious emission: 2M Ch0, 30MHz~3GHz

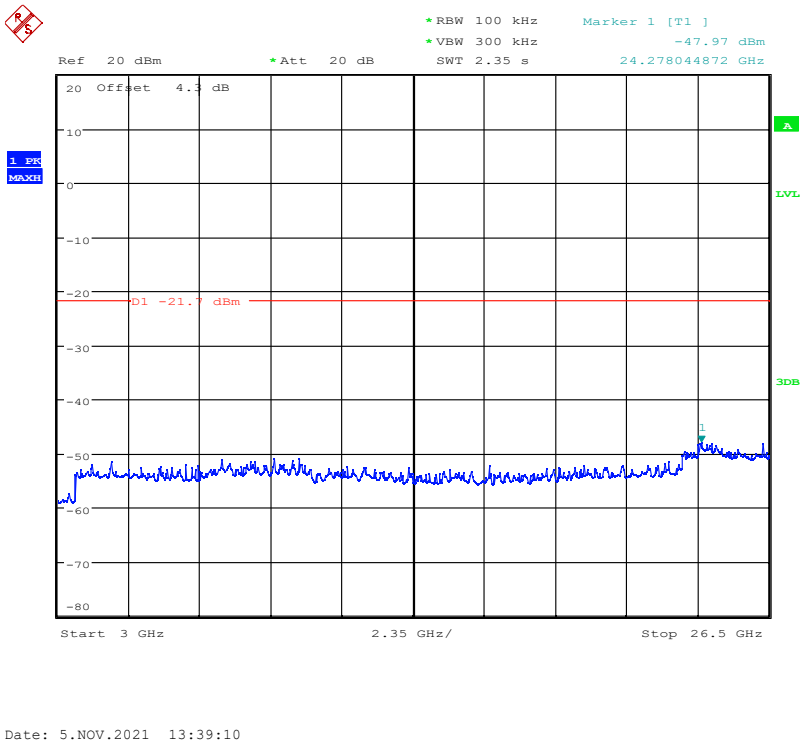


Fig.42 Conducted spurious emission: 2M Ch0, 3GHz~26.5GHz

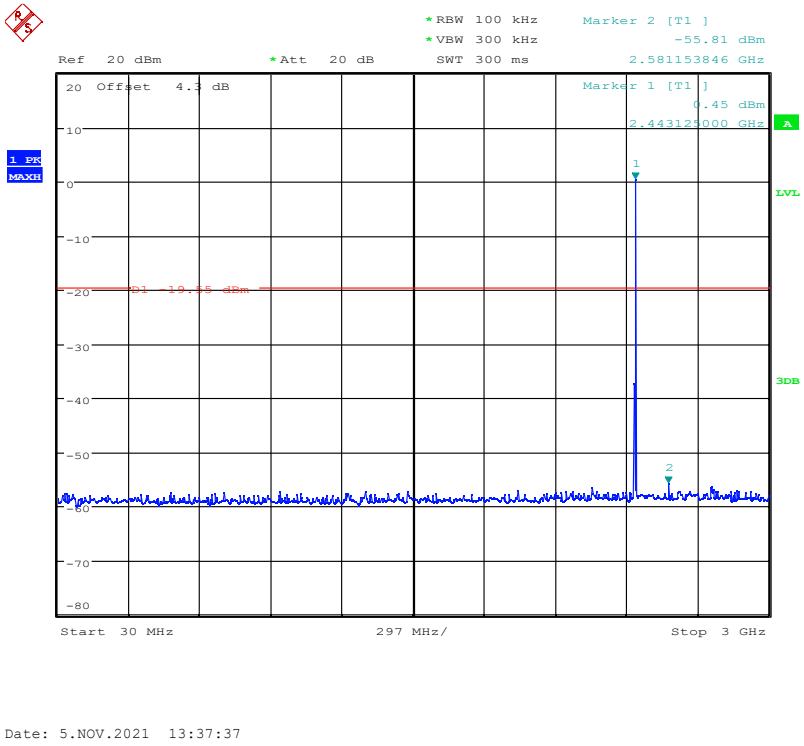


Fig.43 Conducted spurious emission: 2M Ch19, 30MHz~3GHz

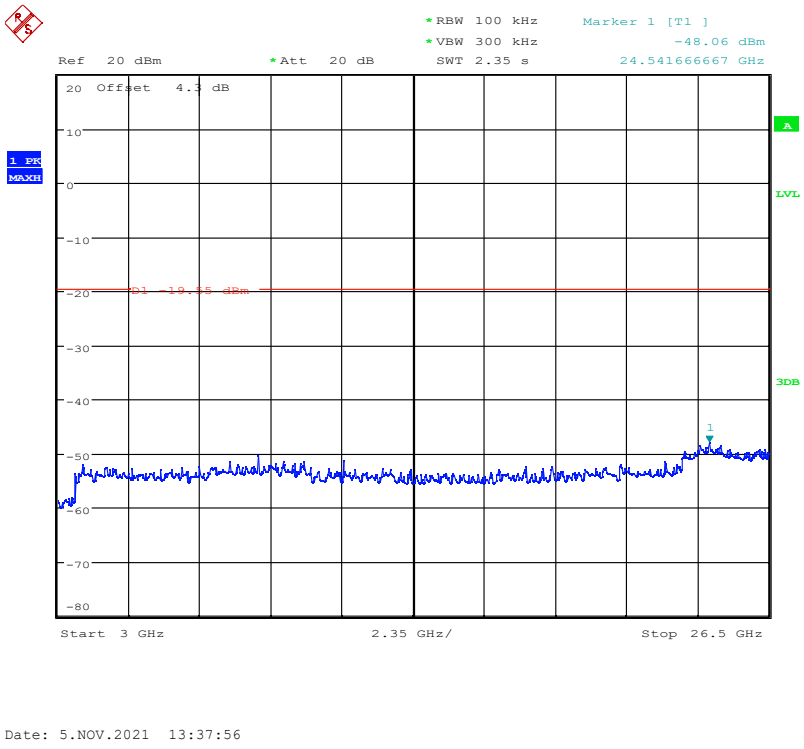


Fig.44 Conducted spurious emission: 2M Ch19, 3GHz~26.5GHz

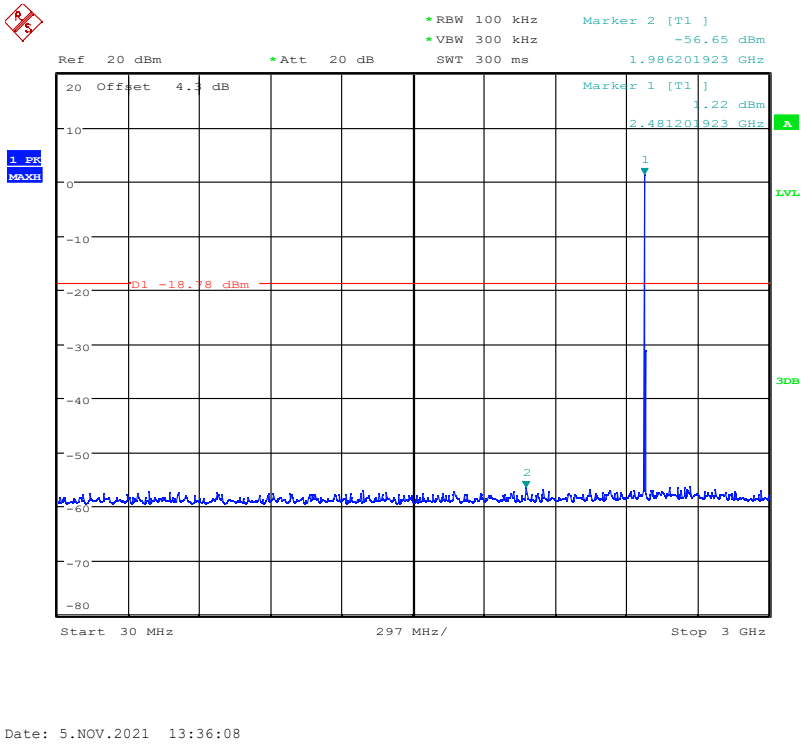


Fig.45 Conducted spurious emission: 2M Ch39, 30MHz~3GHz

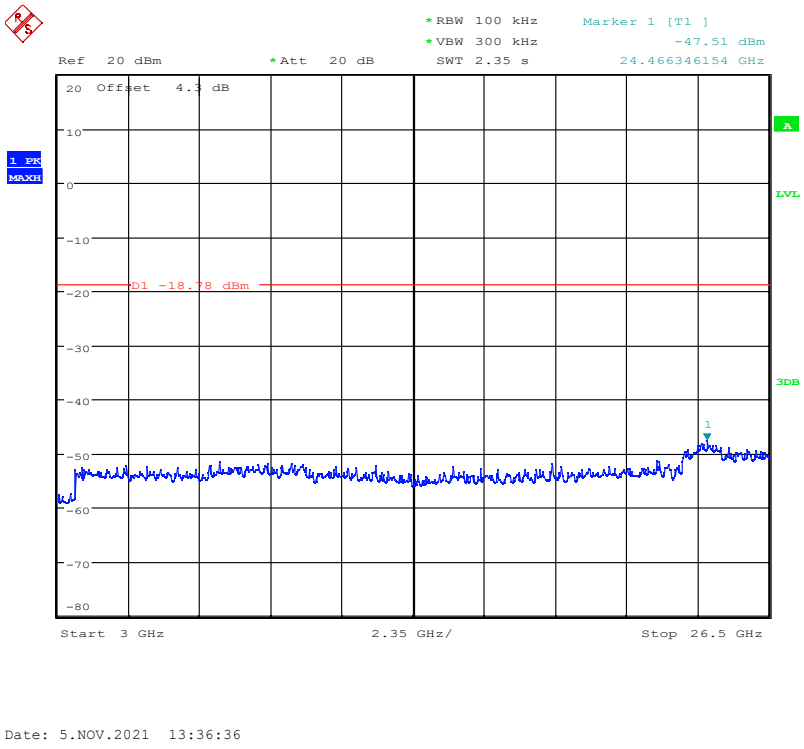


Fig.46 Conducted spurious emission: 2M Ch39, 3GHz~26.5GHz

7.6 Transmitter Spurious Emission-Radiated

Specifications:	FCC 47 CFR Part 15.247, 15.205, 15.209
DUT Serial Number:	860710050007536 M900332GYA111300009
Test conditions:	Ambient Temperature:15℃-35℃ Relative Humidity:30%-60% Air pressure: 86-106kPa
Test Results:	Pass
Note:There are two kinds of antennas in this test, and the data reflect the worst data with large antenna gain.	

Measurement Uncertainty:

Frequency Range	Uncertainty
9kHz ≤ f ≤ 30MHz	4.54dB
30MHz ≤ f ≤ 1GHz	4.09dB
1GHz ≤ f ≤6GHz	4.84dB
6GHz ≤ f ≤18GHz	4.52dB
18GHz ≤ f ≤26.5GHz	6.19dB

Limit in restricted band:

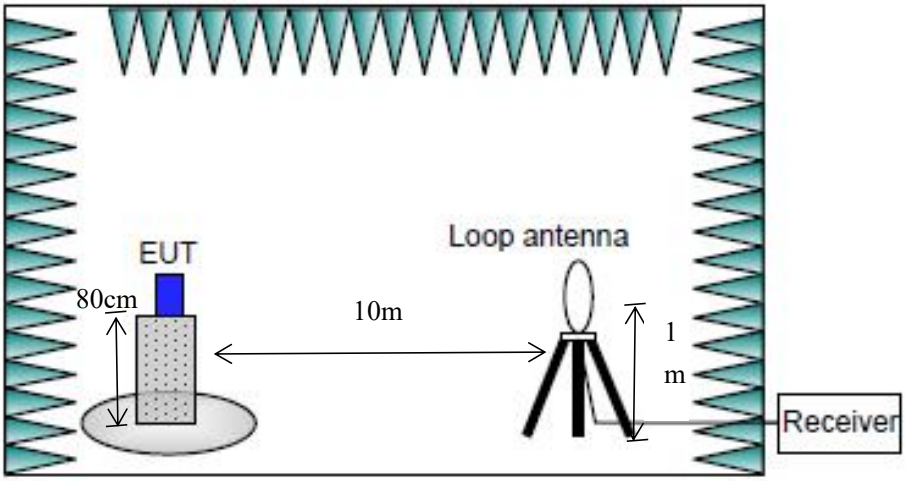
Frequency of emission (MHz)	Field strength (uV/m)	Measurement distance (meters)
0.009-0.49	2400/F(kHz)	300
0.49-1.705	24000/F(kHz)	30
1.705-30	30	30

Frequency of emission (MHz)	Field strength (uV/m)	Field strength (dBuV/m)
30~88	100	40
88~216	150	43.5
216~960	200	46
Above 960	500	54

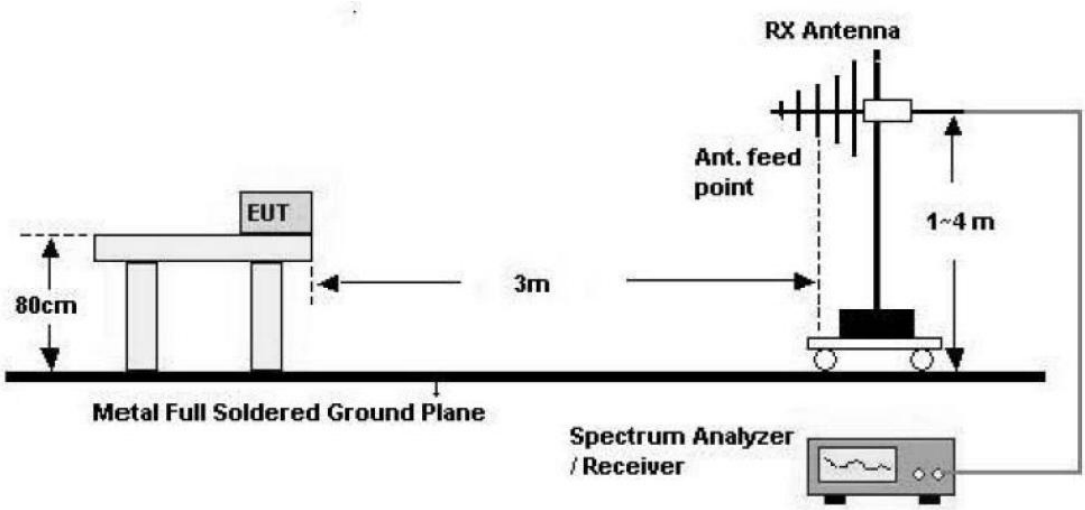
Test Setup

The EUT was placed in an anechoic chamber.. The transmitter output is connected to Spectrum analyzer through a loop antenna (for frequency below 30MHz) or a Bilog antenna (for frequency 30MHz-1GHz) or a horn antenna (for frequency above 1GHz).

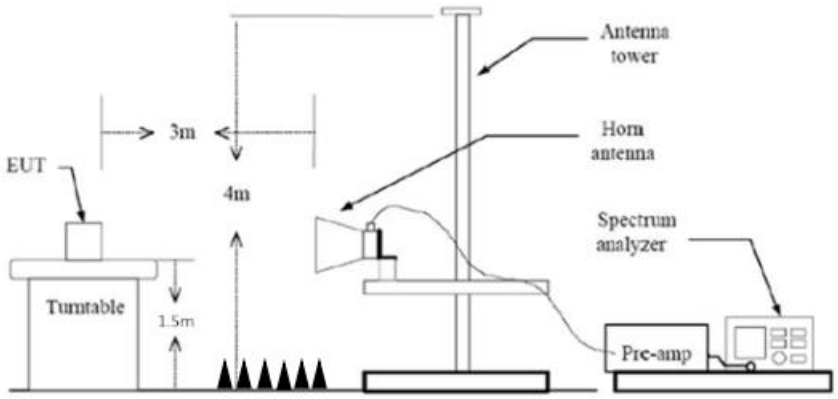
Below 30MHz:



30MHz-1GHz:



Above 1GHz:



Test Procedure

Portable, small, lightweight, or modular devices that may be handheld, worn on the body, or placed on a table 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	10kHz/30KHz	5
30~1000	100KHz/300KHz	5
1000~4000	1MHz/1MHz	15
4000~18000	1MHz/1MHz	40
18000~26500	1MHz/1MHz	20

Test Result:

A “reference path loss” is established and ARpi 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:

ARpi= Cable loss + Antenna Gain-Preamplifier gain

Result=PMea + ARpi

	Channel	Frequency Range	Test Results	Conclusion
BLE	All channels	30MH-1GHz	Fig.35	Pass
	0(1M)	1GHz-3GHz	Fig.36	Pass
		3GHz-18GHz	Fig.37	
	19(1M)	1GHz-3GHz	Fig.38	Pass
		3GHz-18GHz	Fig.39	
	39(1M)	1GHz-3GHz	Fig.40	Pass
		3GHz-18GHz	Fig.41	
	0(2M)	1GHz-3GHz	Fig.42	Pass
		3GHz-18GHz	Fig.43	
	19(2M)	1GHz-3GHz	Fig.44	Pass
		3GHz-18GHz	Fig.45	
	39(2M)	1GHz-3GHz	Fig.46	Pass
		3GHz-18GHz	Fig.47	
	All channels	18GHz-26.5GHz	Fig.48	Pass
	Band-edge 0(1M)	2.31GHz-2.43GHz	Fig.49	Pass
	Band-edge 39(1M)	2.47GHz-2.5GHz	Fig.50	Pass

	Band-edge 0(2M)	2.31GHz-2.43GHz	Fig.51	Pass
	Band-edge 39(2M)	2.47GHz-2.5GHz	Fig.52	Pass

Note: The EUT was pretested with 3 orientations placed on the table for the radiated emission measurement –X, Y, and Z-plane. The X-plane results were found as the worst case and were shown in this report.

Transmitter Spurious Emission-Radiated H and V are tested together,The test result is maximum hold. Therefore, the result is only one set of data. Found the emission level are attenuated 20dB below the limits for frequency rage 9kHz to 30MHz, so it does not recorded in report.

The 30MHz-1GHz and 18GHz-26.5GHz results were found as the worst case and were shown in this report.

Conclusion: PASS

Test graphs as below:

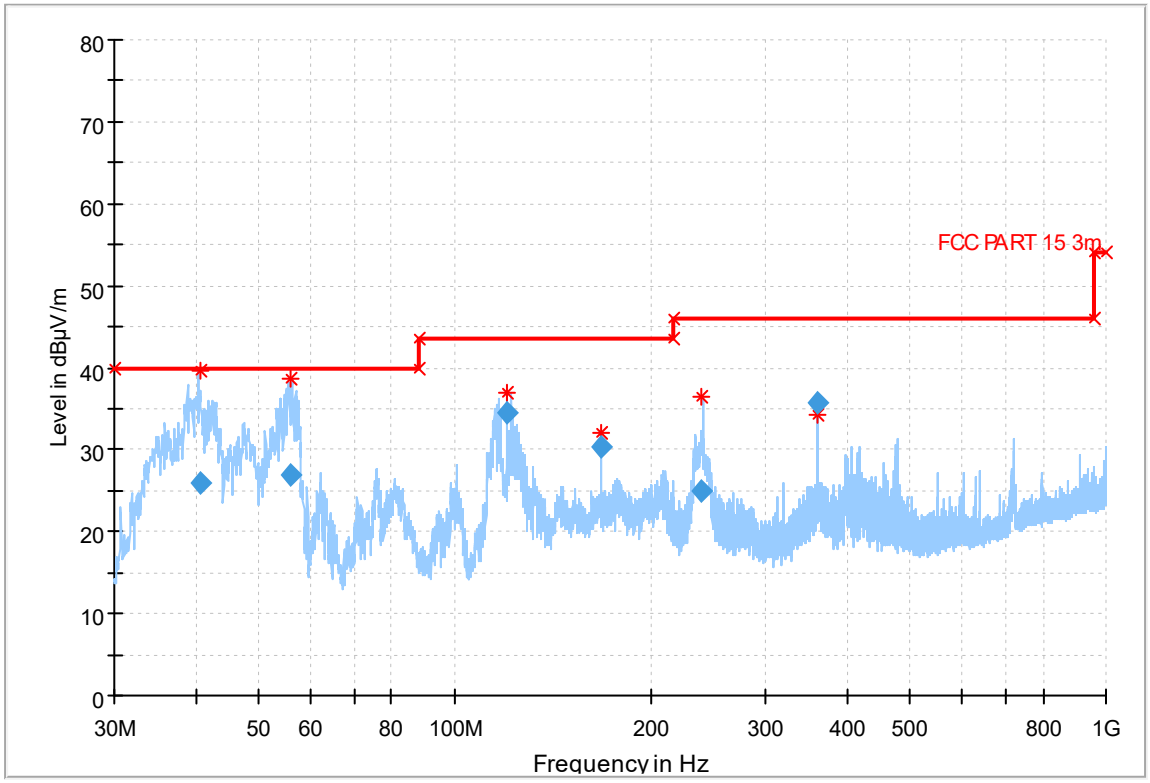


Fig.47 Radiated emission: Ch0, 2M, 30MHz-1GHz

Final Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
40.779000	25.93	40.00	14.07	1000.0	120.000	116.0	V	-31.0
56.087000	26.84	40.00	13.16	1000.0	120.000	133.0	V	-41.0
120.007500	34.52	43.50	8.98	1000.0	120.000	100.0	V	27.0
167.982500	30.30	43.50	13.20	1000.0	120.000	106.0	V	171.0
239.582000	24.89	46.00	21.11	1000.0	120.000	150.0	H	209.0
359.994000	35.64	46.00	10.36	1000.0	120.000	133.0	V	157.0

Note: This result is the worst value, and both horizontal polarization and vertical polarization are tested

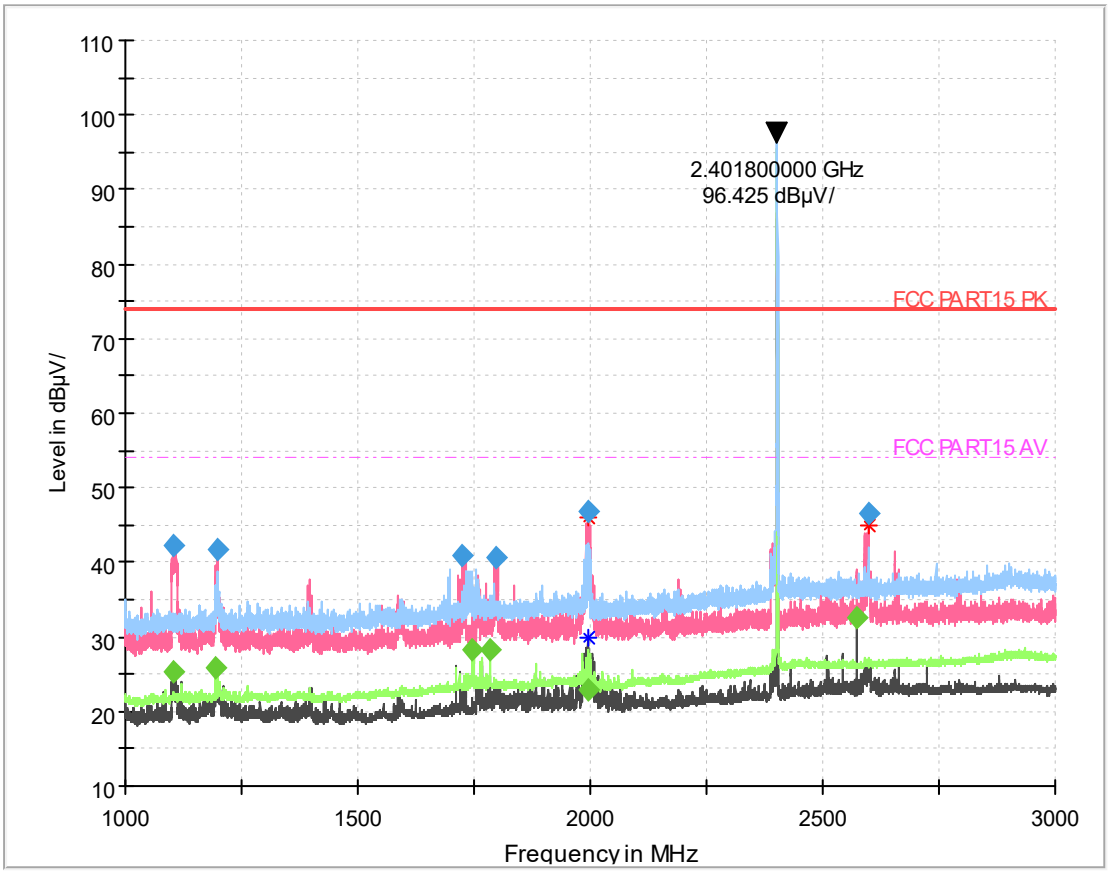


Fig.48 Radiated emission: Ch0, 1M 1GHz-3GHz

Final Result

Frequency (MHz)	MaxPeak (dBµV/m)	Averge (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
1993.600000	---	23.03	54.00	30.97	50.0	1000.000	150.0	V	25.0
1994.800000	46.89	---	74.00	27.11	50.0	1000.000	150.0	V	191.0
2597.000000	46.52	---	74.00	27.48	50.0	1000.000	150.0	V	184.0
1105.400000	42.28	---	74.00	31.72	50.0	1000.000	150.0	V	146.0
1105.200000	---	25.42	54.00	28.58	50.0	1000.000	165.0	V	263.0
1200.000000	41.82	---	74.00	32.18	50.0	1000.000	150.0	V	79.0
1196.000000	---	25.77	54.00	29.23	50.0	1000.000	150.0	H	84.0
1726.200000	41.03	---	74.00	32.97	50.0	1000.000	145.0	H	84.0
1746.800000	---	28.21	54.00	25.79	50.0	1000.000	150.0	H	180.0
1796.400000	40.68	---	74.00	33.32	50.0	1000.000	150.0	H	180.0
1784.800000	---	28.19	54.00	25.81	50.0	1000.000	150.0	H	236.0
2573.400000	---	32.59	54.00	21.41	50.0	1000.000	150.0	H	252.0

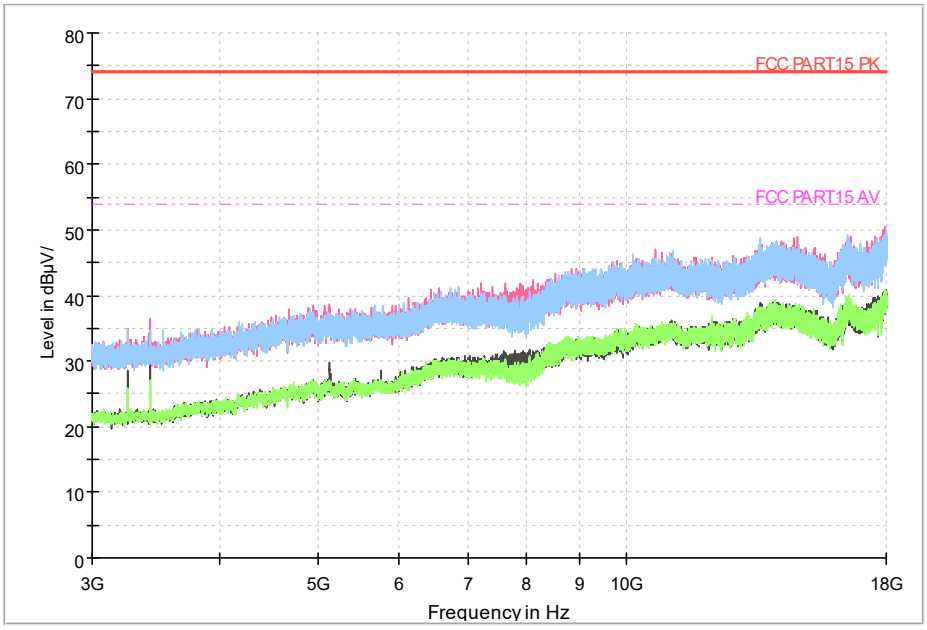


Fig.49 Radiated emission: Ch0, 1M, 3GHz-18GHz

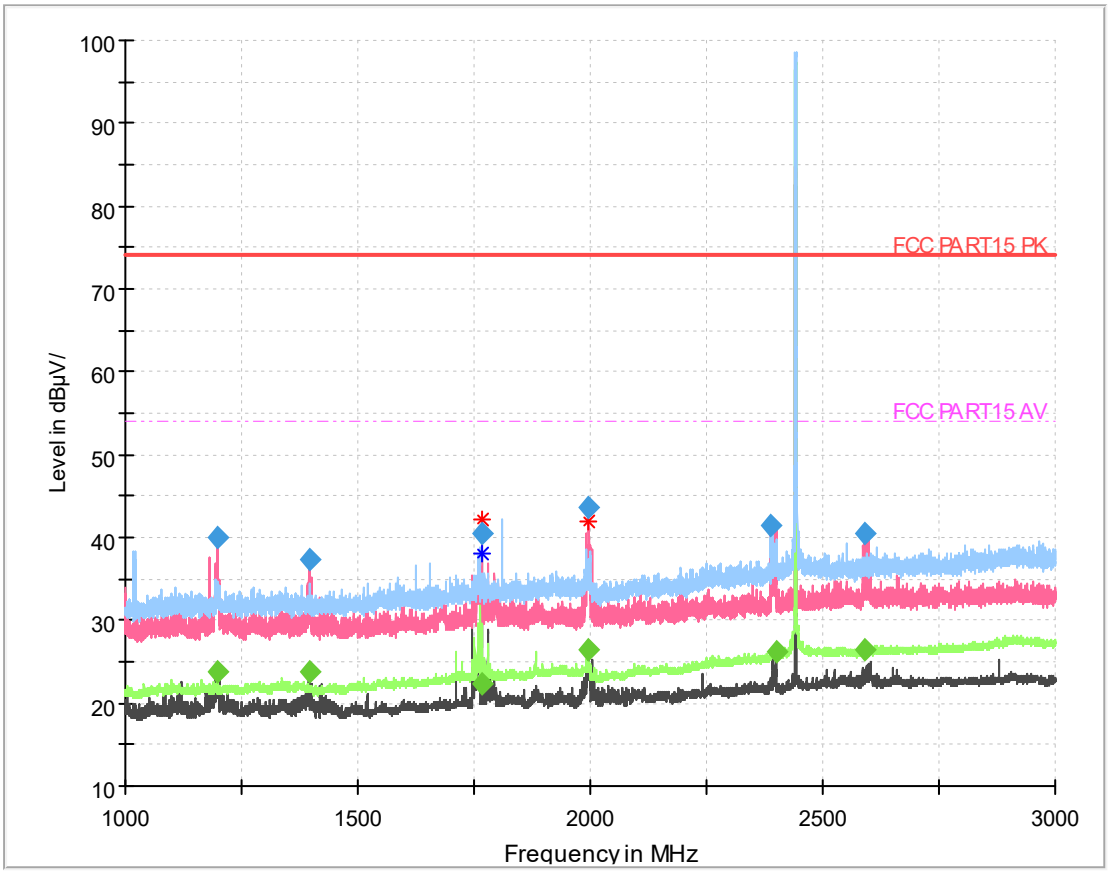


Fig.50 Radiated emission: Ch19,1M 1GHz-3GHz

Final Result

Frequency (MHz)	MaxPeak (dBµV/m)	Averge (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
1766.000000	40.37	---	74.00	33.63	50.0	1000.000	150.0	V	103.0
1766.200000	---	22.38	54.00	31.62	50.0	1000.000	150.0	V	103.0
1997.800000	43.53	---	74.00	30.47	50.0	1000.000	150.0	V	-31.0
1993.800000	---	26.41	54.00	27.59	50.0	1000.000	150.0	V	-31.0
1198.000000	40.04	---	74.00	33.96	50.0	1000.000	150.0	H	45.0
1200.400000	---	23.89	54.00	30.11	50.0	1000.000	150.0	H	45.0
1397.800000	37.26	---	74.00	36.74	50.0	1000.000	150.0	H	136.0
1394.400000	---	23.67	54.00	30.33	50.0	1000.000	150.0	H	136.0
2390.000000	41.54	---	74.00	32.46	50.0	1000.000	150.0	H	201.0
2398.800000	---	26.10	54.00	27.90	50.0	1000.000	150.0	H	201.0
2591.400000	40.53	---	74.00	33.47	50.0	1000.000	150.0	H	178.0
2592.600000	---	26.47	54.00	27.53	50.0	1000.000	150.0	H	178.0

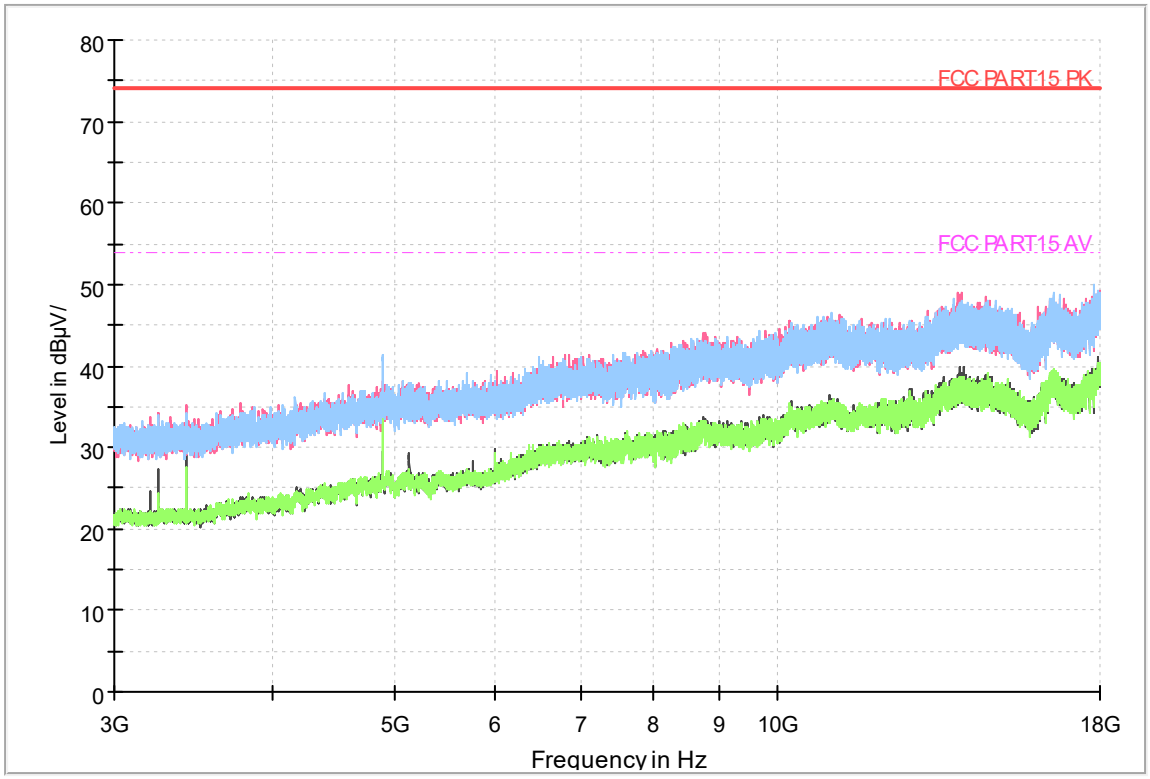


Fig.51 Radiated emission: Ch19, 1M 3GHz-18GHz

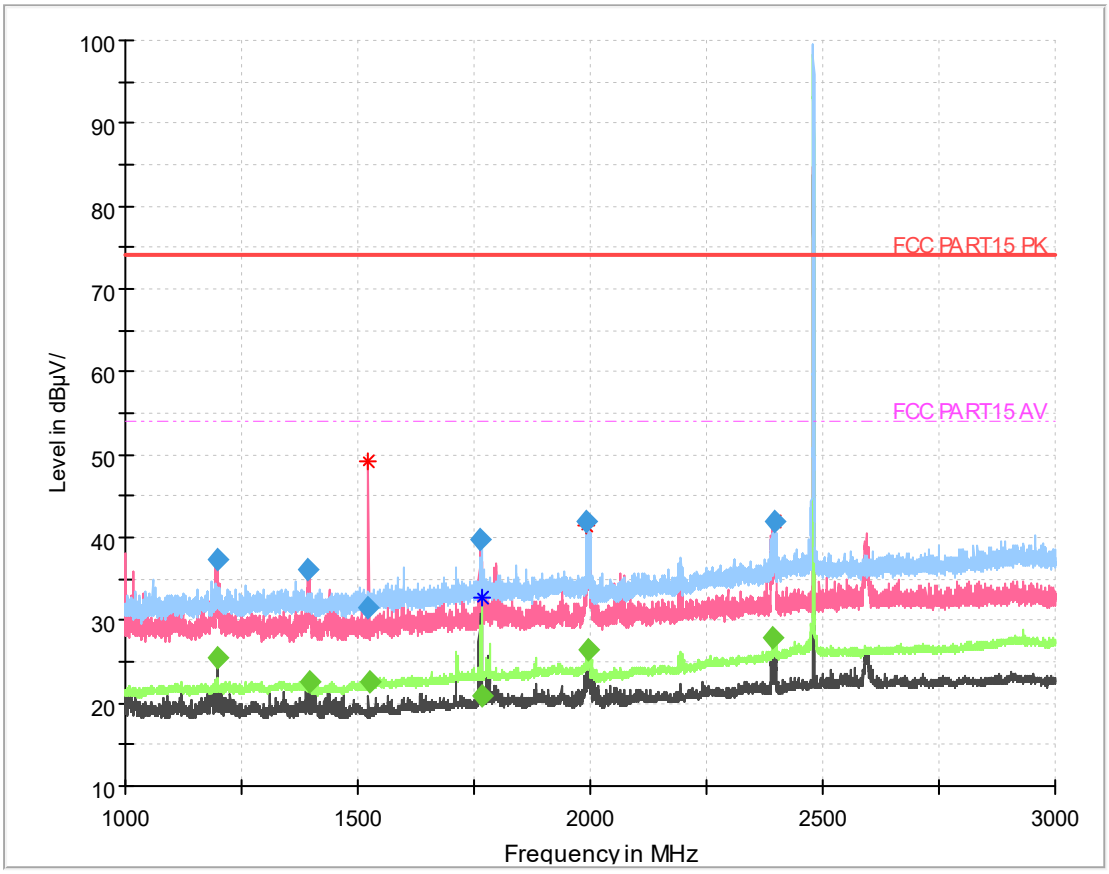


Fig.52 Radiated emission: 1M Ch39, 1GHz-3GHz

Final Result

Frequency (MHz)	MaxPeak (dBµV/m)	Averge (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
1523.600000	31.65	---	74.00	42.35	50.0	1000.000	150.0	V	4.0
1766.000000	---	20.85	54.00	33.15	50.0	1000.000	150.0	H	200.0
1992.600000	41.94	---	74.00	32.06	50.0	1000.000	150.0	H	-51.0
2395.000000	41.87	---	74.00	32.13	50.0	1000.000	150.0	V	34.0
1198.800000	37.24	---	74.00	36.76	50.0	1000.000	150.0	H	82.0
1196.400000	---	25.45	54.00	28.55	50.0	1000.000	150.0	H	82.0
1393.200000	36.22	---	74.00	37.78	50.0	1000.000	150.0	H	153.0
1397.000000	---	22.50	54.00	31.50	50.0	1000.000	150.0	H	153.0
1523.800000	---	22.67	54.00	31.33	50.0	1000.000	150.0	H	200.0
1762.400000	39.71	---	74.00	33.29	50.0	1000.000	150.0	H	34.0
1993.800000	---	26.41	54.00	27.59	50.0	1000.000	150.0	H	2.0
2391.800000	---	27.87	54.00	26.13	50.0	1000.000	150.0	H	153.0

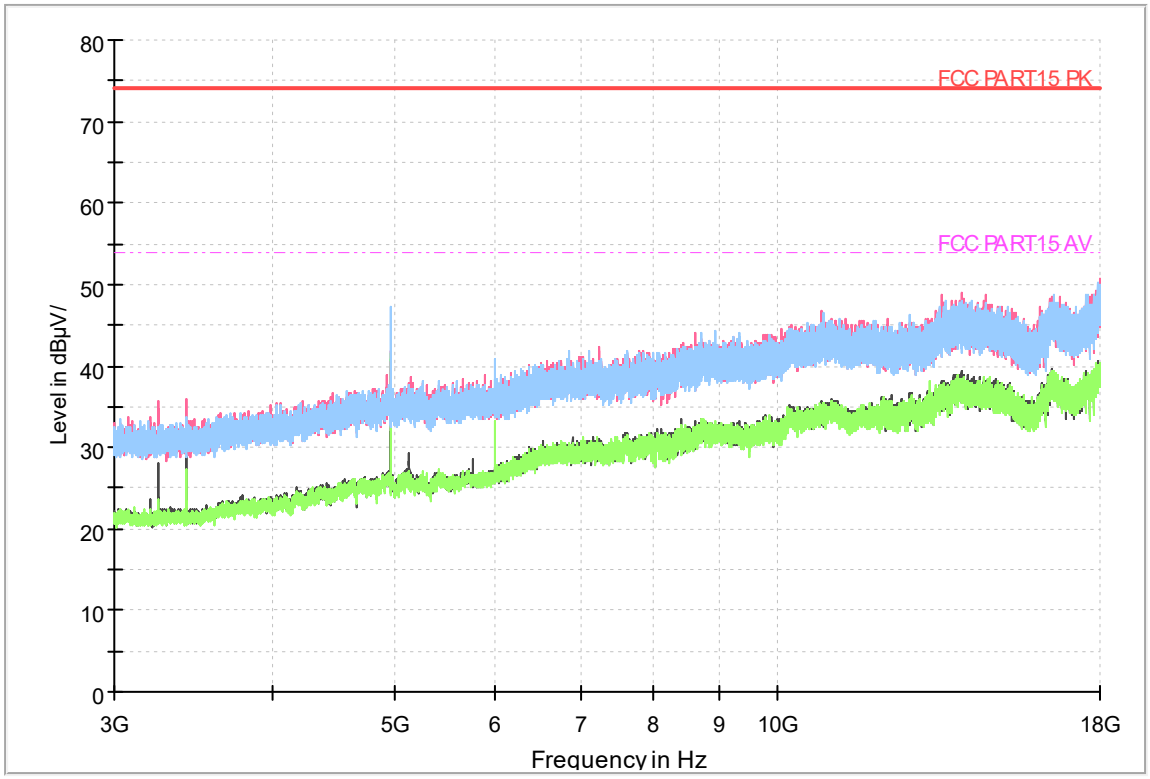


Fig.53 Radiated emission: Ch39, 1M 3GHz-18GHz

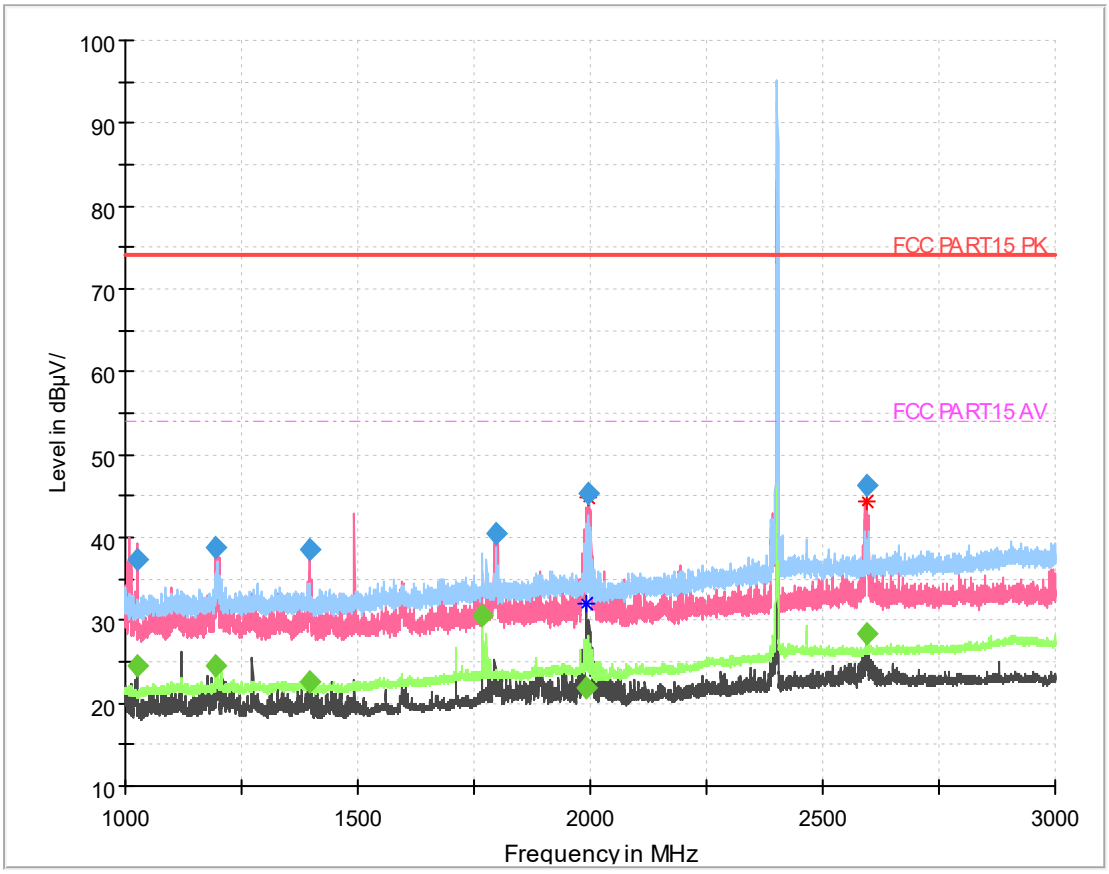


Fig.54 Radiated emission: 2M Ch00, 1GHz-3GHz

Final Result

Frequency (MHz)	MaxPeak (dBµV/m)	Averge (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
1992.800000	---	21.88	54.00	32.12	50.0	1000.000	150.0	V	-89.0
1995.400000	45.31	---	74.00	28.69	50.0	1000.000	150.0	V	7.0
2596.400000	46.30	---	74.00	27.70	50.0	1000.000	150.0	V	185.0
1195.800000	38.79	---	74.00	35.21	50.0	1000.000	150.0	H	63.0
1194.000000	---	24.49	54.00	30.51	50.0	1000.000	150.0	H	63.0
1394.800000	38.46	---	74.00	35.54	50.0	1000.000	150.0	H	132.0
1398.400000	---	22.49	54.00	31.51	50.0	1000.000	150.0	H	132.0
1797.000000	40.60	---	74.00	33.40	50.0	1000.000	150.0	H	220.0
1768.400000	---	30.61	54.00	23.39	50.0	1000.000	150.0	H	220.0
2596.400000	---	28.48	54.00	25.52	50.0	1000.000	150.0	H	185.0
1027.600000	37.32	---	74.00	36.68	50.0	1000.000	150.0	H	59.0
1025.600000	---	24.59	54.00	29.41	50.0	1000.000	150.0	H	59.0

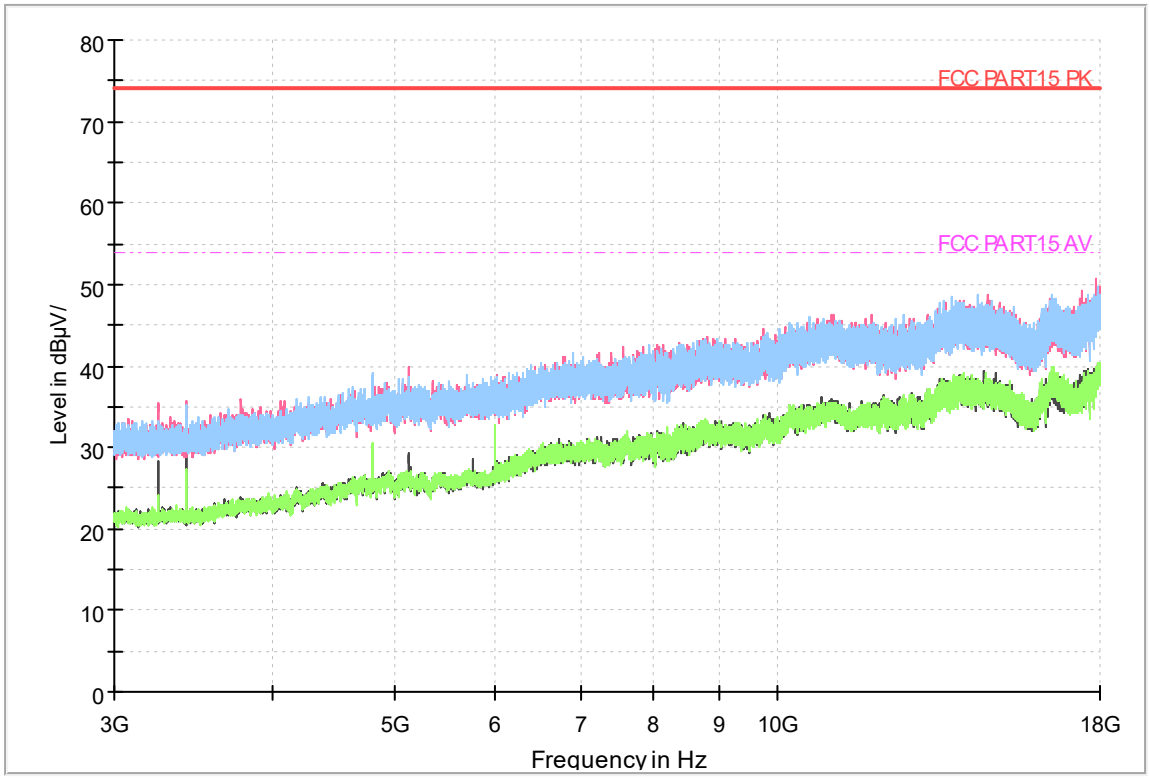


Fig.55 Radiated emission: Ch00, 2M 3GHz-18GHz

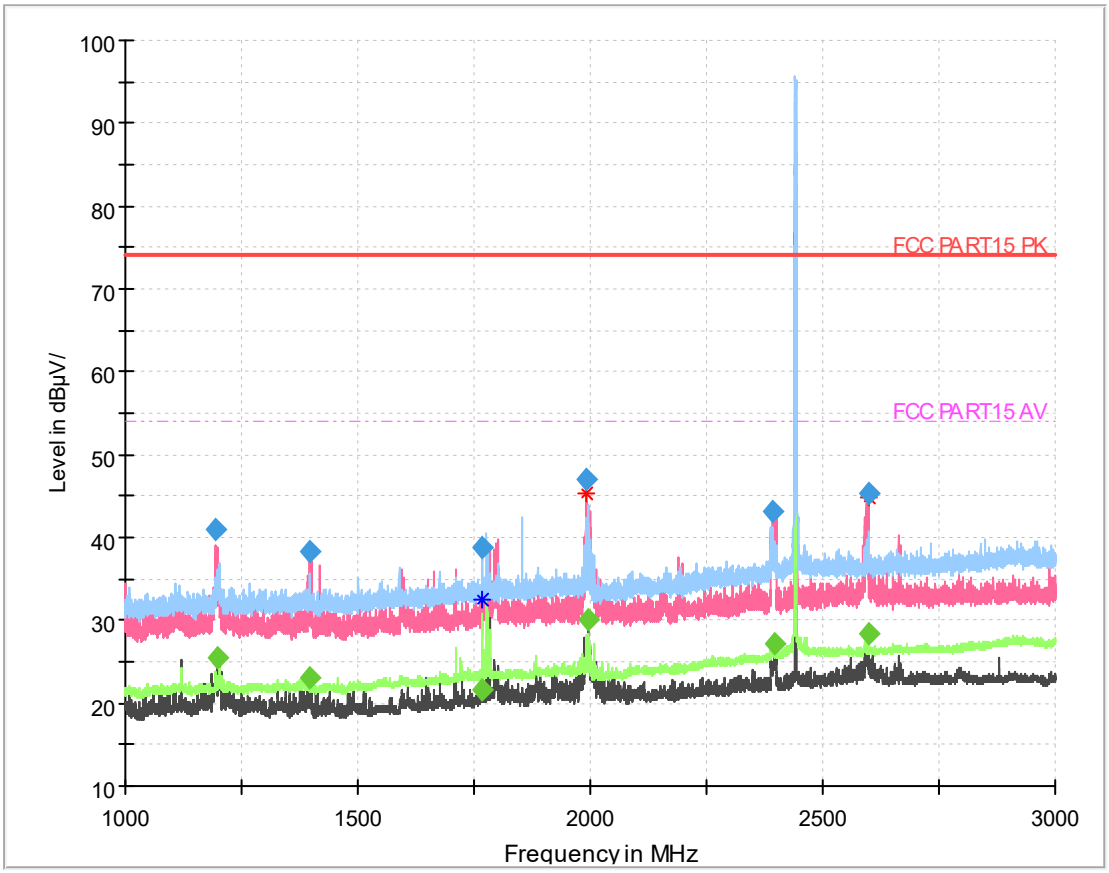


Fig.56 Radiated emission: 2M Ch19, 1GHz-3GHz

Final Result

Frequency (MHz)	MaxPeak (dBµV/m)	Averge (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
1766.600000	38.79	---	74.00	35.21	50.0	1000.000	150.0	H	178.0
1766.200000	---	21.59	54.00	32.41	50.0	1000.000	150.0	V	178.0
1992.400000	47.01	---	74.00	26.99	50.0	1000.000	150.0	V	20.0
1995.800000	---	30.20	54.00	23.80	50.0	1000.000	150.0	V	20.0
2598.600000	45.29	---	74.00	28.71	50.0	1000.000	150.0	V	20.0
2598.200000	---	28.37	54.00	25.63	50.0	1000.000	150.0	H	20.0
2393.200000	43.12	---	74.00	30.88	50.0	1000.000	150.0	H	96.0
2395.400000	---	27.20	54.00	26.80	50.0	1000.000	150.0	H	96.0
1194.400000	40.93	---	74.00	33.07	50.0	1000.000	150.0	H	216.0
1196.800000	---	25.39	54.00	28.61	50.0	1000.000	150.0	H	216.0
1398.000000	38.23	---	74.00	35.77	50.0	1000.000	150.0	H	196.0
1394.600000	---	23.07	54.00	30.93	50.0	1000.000	150.0	H	196.0

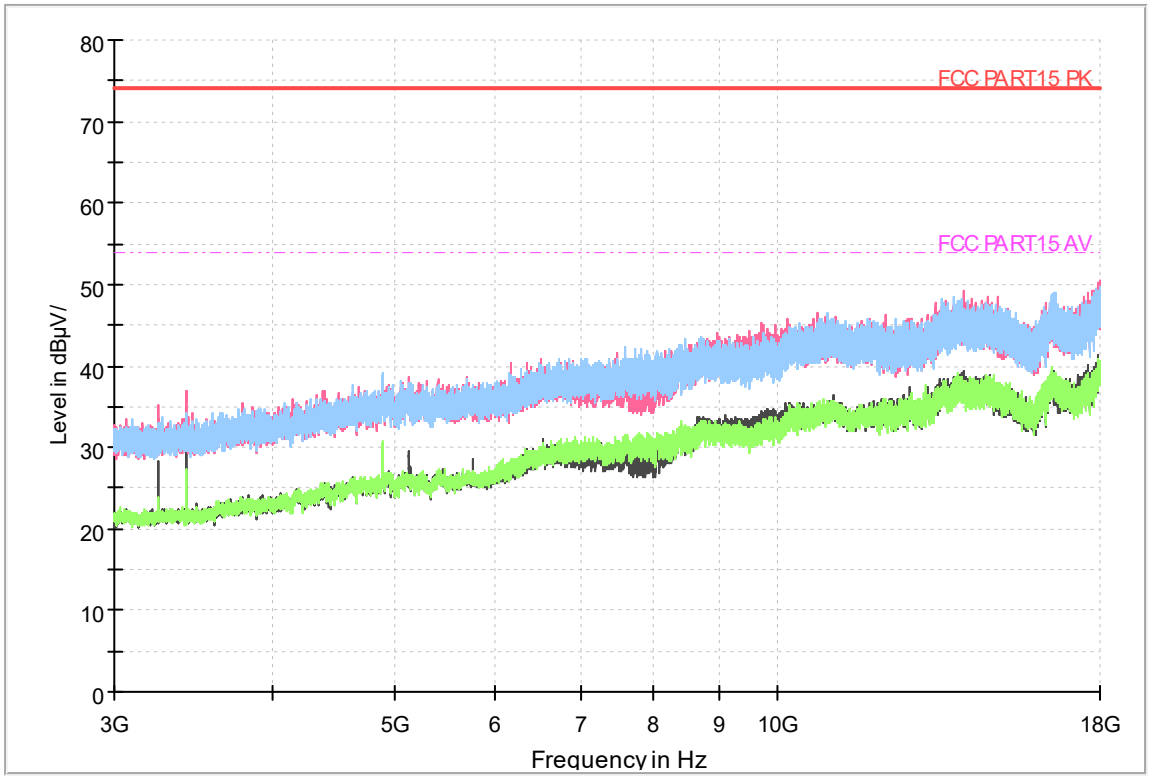


Fig.57 Radiated emission: 2M Ch19, 3GHz-18GHz

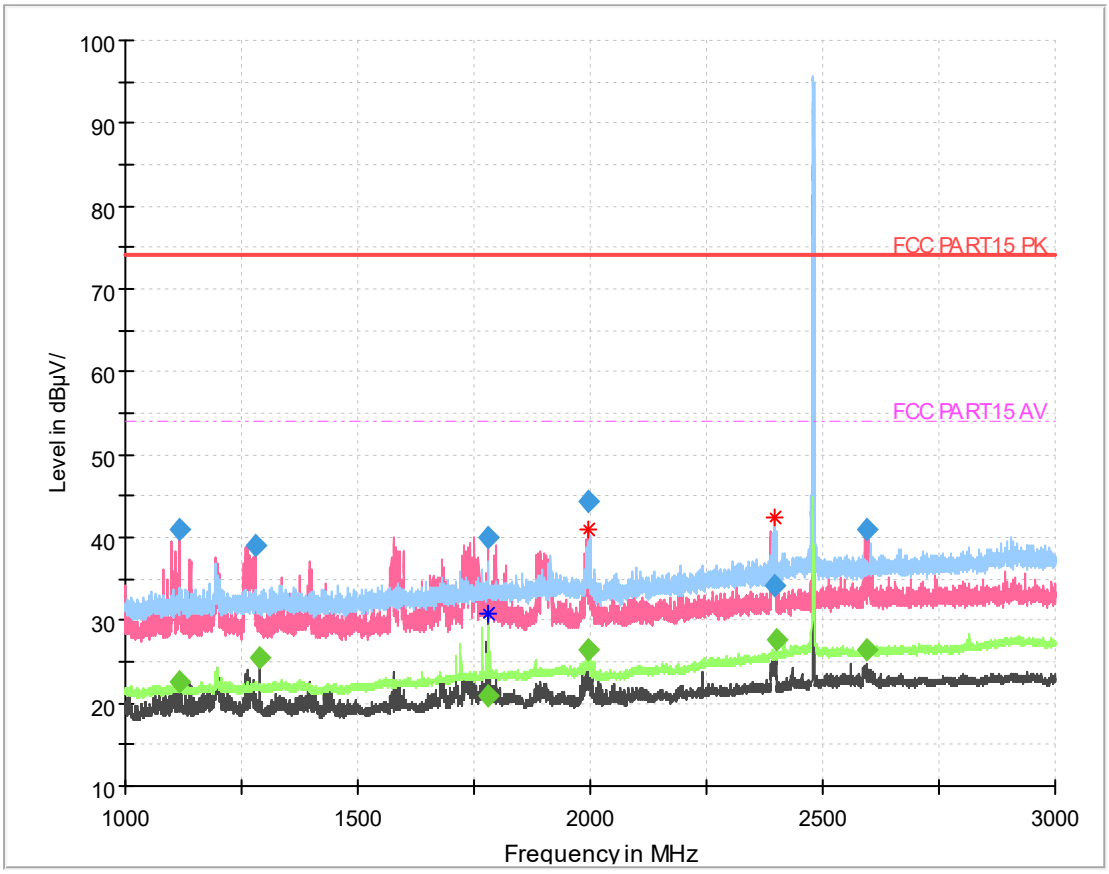


Fig.58 Radiated emission: 2M Ch39, 1GHz-3GHz

Final Result

Frequency (MHz)	MaxPeak (dBµV/m)	Averge (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
1781.600000	39.98	---	74.00	35.02	50.0	1000.000	150.0	H	154.0
1781.600000	---	20.88	54.00	33.12	50.0	1000.000	150.0	V	154.0
1996.800000	44.37	---	74.00	29.63	50.0	1000.000	150.0	V	9.0
1997.000000	---	26.55	54.00	27.45	50.0	1000.000	150.0	H	9.0
2396.000000	34.09	---	74.00	39.91	50.0	1000.000	150.0	H	-72.0
2399.200000	---	27.70	54.00	26.40	50.0	1000.000	150.0	H	-72.0
1117.600000	40.86	---	74.00	33.14	50.0	1000.000	150.0	H	105.0
1117.400000	---	22.50	54.00	31.50	50.0	1000.000	150.0	H	105.0
1279.800000	39.06	---	74.00	34.94	50.0	1000.000	150.0	H	78.0
1288.800000	---	25.44	54.00	28.56	50.0	1000.000	150.0	H	78.0
2594.800000	40.85	---	74.00	33.15	50.0	1000.000	150.0	H	178.0
2594.200000	---	26.51	54.00	27.49	50.0	1000.000	150.0	H	178.0

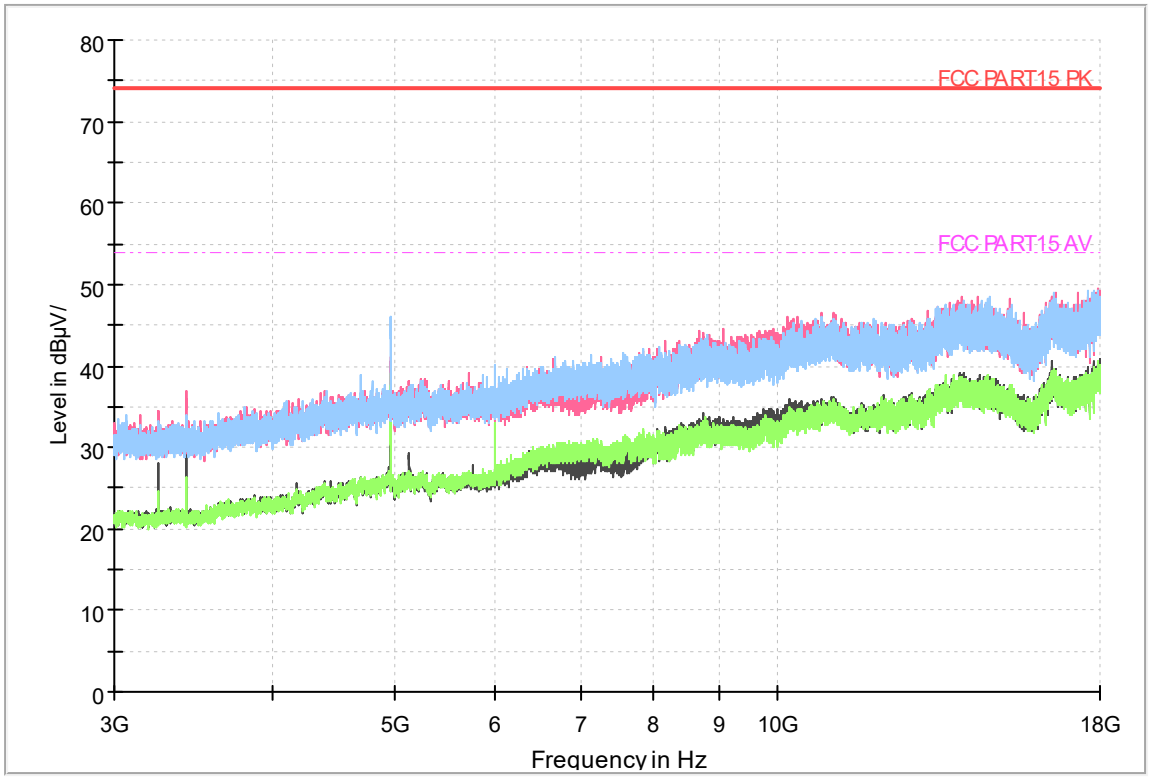


Fig.59 Radiated emission: 2M Ch39, 3GHz-18GHz

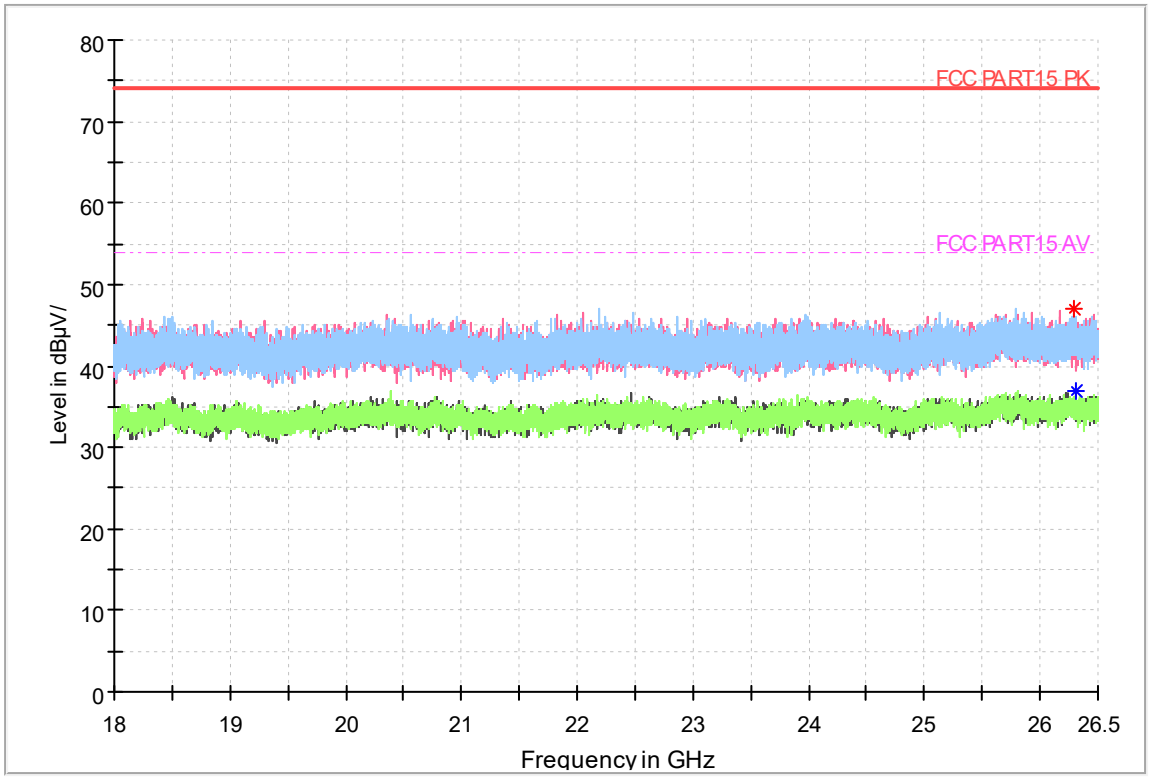


Fig.60 Radiated emission: 18 GHz - 26.5 GHz

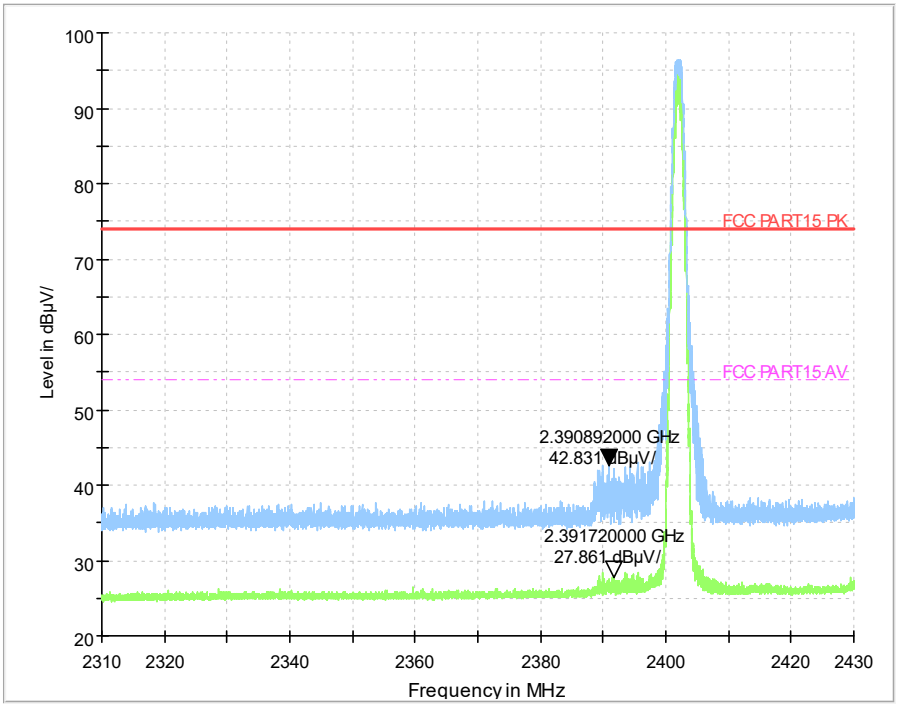


Fig.61 Frequency Band Edge:1M Ch0

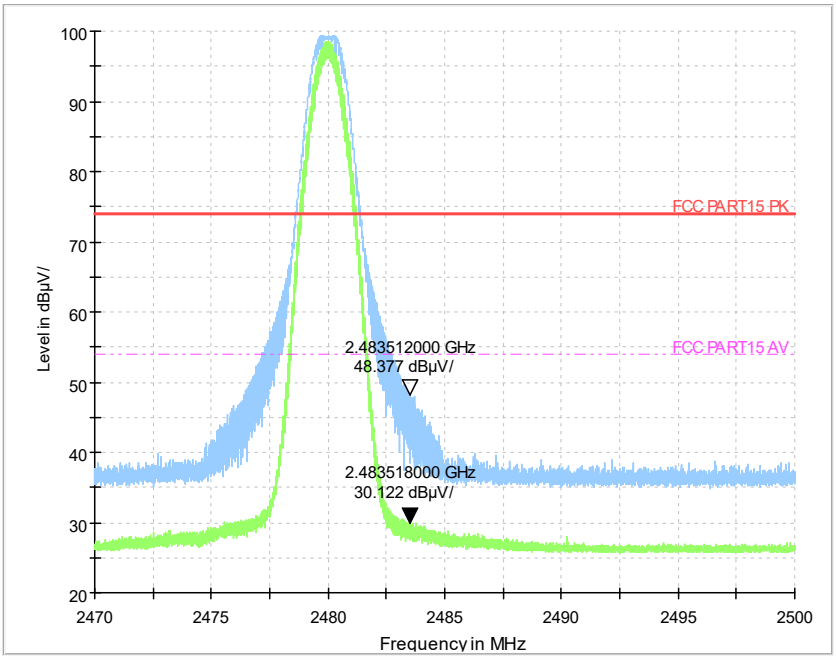


Fig.62 Frequency Band Edge: 1M Ch39

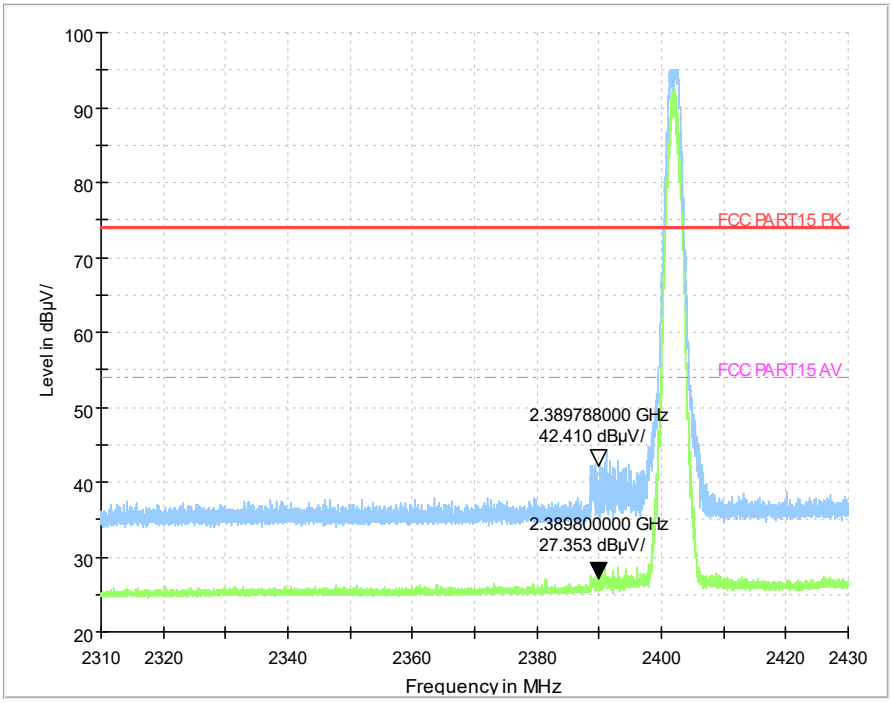


Fig.63 Frequency Band Edge: 2M Ch0

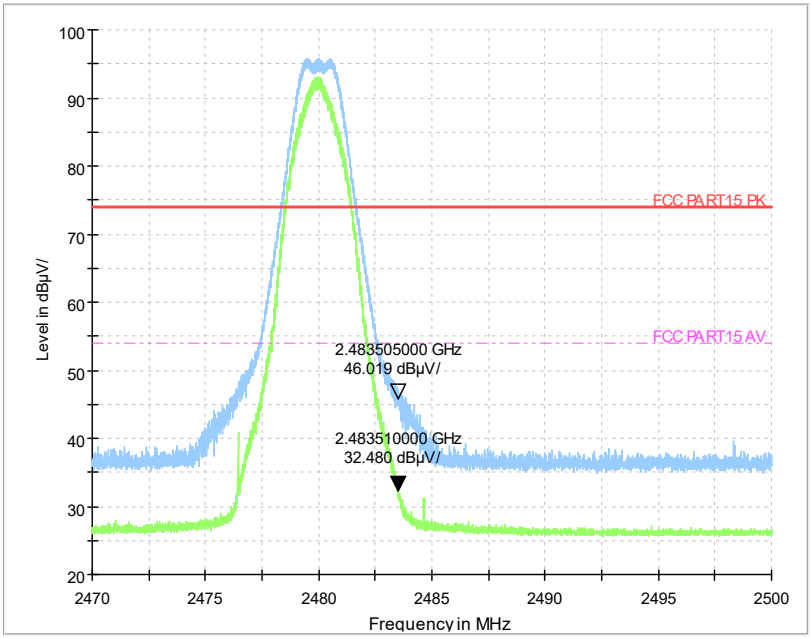


Fig.64 Frequency Band Edge: 2M Ch39

Test photo

See the in document" WIFI/BT_Test Setup Photos".

7.7 Power line Conducted Emissions

Specifications:	ANSI C63.10 voltage mains test
DUT Serial Number:	M900332GYA111300009
Test conditions:	Ambient Temperature:15℃-35℃ Relative Humidity:30%-60% Air pressure: 86-106kPa
Test Results:	Pass

Limit

The EUT meets the requirement of having a peak to average ratio of less than 13dB.

For an intentional radiator which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed 250 microvolt (The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz). The limits at specific frequency range are listed as follows:

Measurement Uncertainty:

Frequency Range	Uncertainty
150 kHz to 30 MHz	1.83

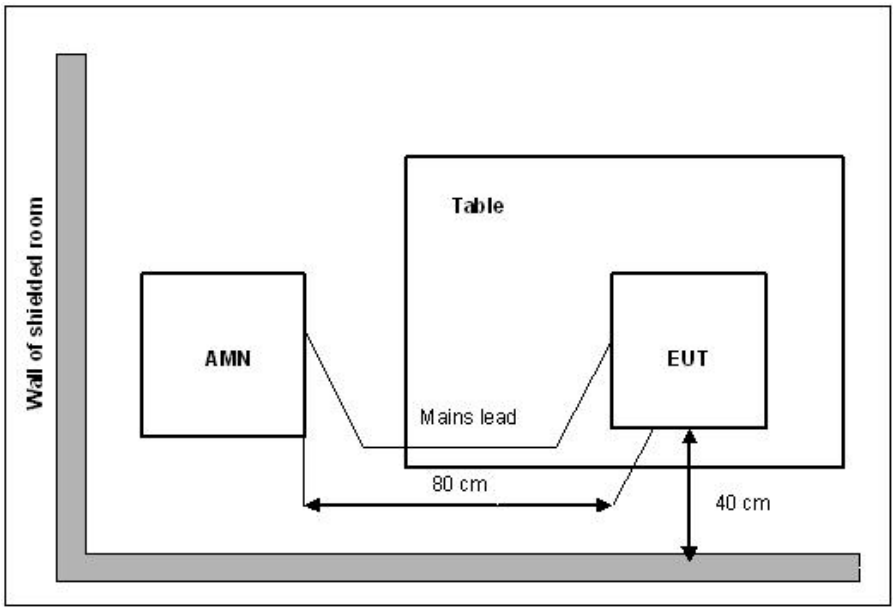
Limits of the conducted disturbance at the AC mains ports:

Frequency range	Limit(Quasi-peak)	Limit(Average)
0.15 MHz to 0.5 MHz	66 dBμV – 56 dBμV	56 dBμV – 46 dBμV
>0.5 MHz to 5MHz	56 dBμV	46 dBμV
>5 MHz to 30 MHz	60 dBμV	50 dBμV
NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.		

Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line (LINE and NEUTRAL) and ground at the power terminals.

Test Setup

The EUT was placed in a shielding room. The WLAN TESTER was used to set the TX channel and power level. The ac adapter output is connected to Receiver through an AMN (Artificial Mains Network).



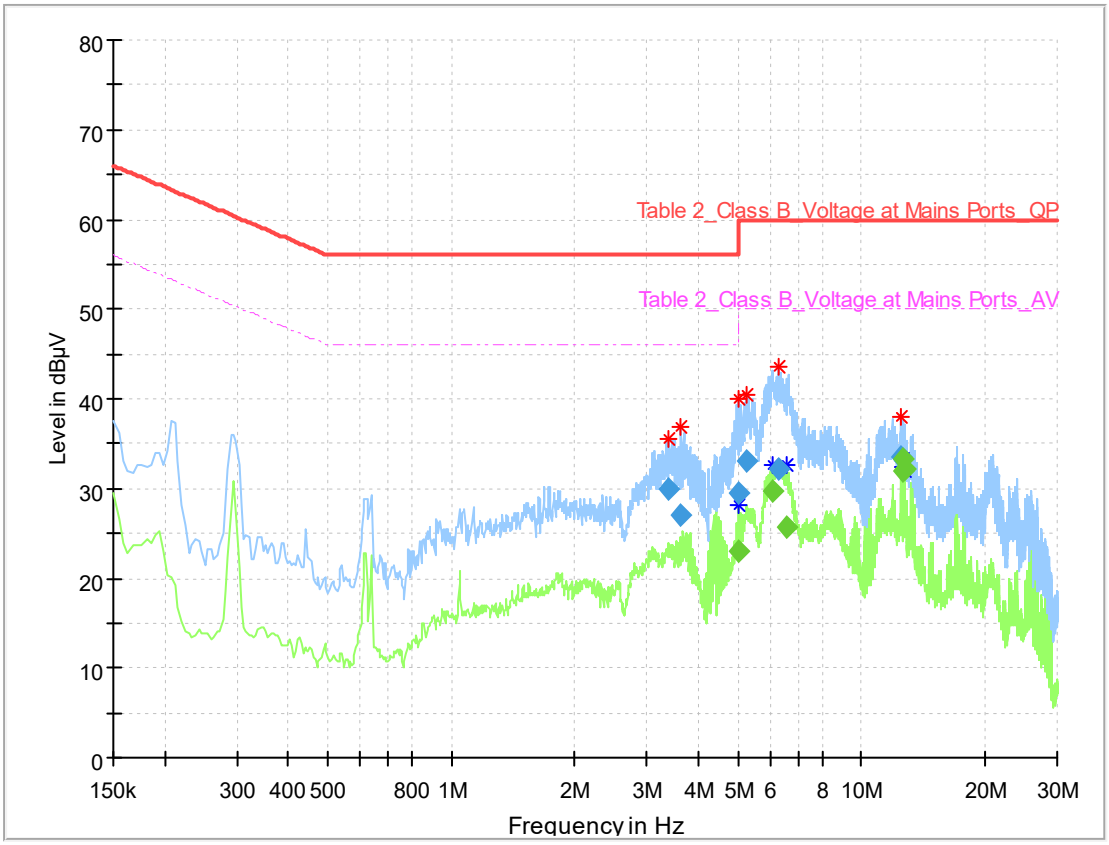
Test Procedure

1. The EUT is placed on a wooden table 80 cm above the reference ground plane.
2. The EUT is connected via LISN to a test power supply.
3. The measurement results are obtained as described below:
4. Detectors – Quasi Peak and Average Detector.

The measurement is made according to ANSI C63.10-2013.

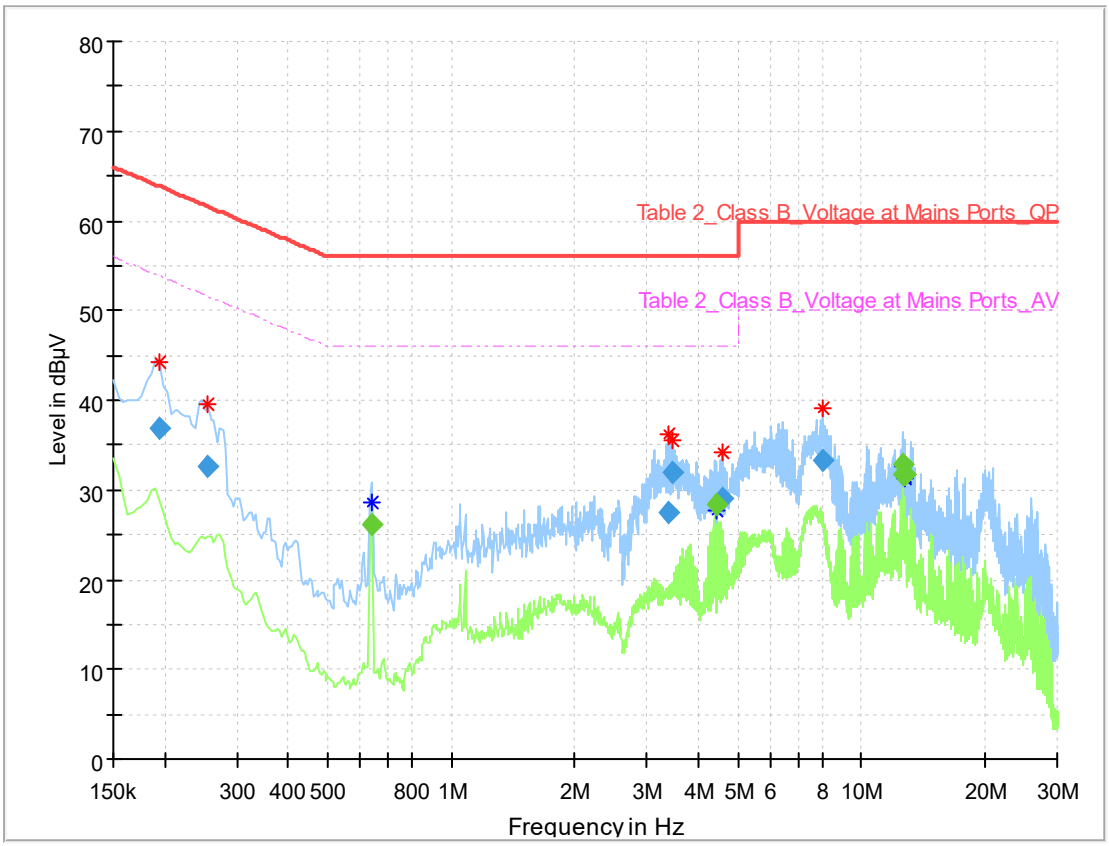
Conclusion: PASS

Test Result:



Final Result 1

Frequency (MHz)	QuasiPeak (dB µ V)	Averge (dB µ V)	Limit (dB µ V)	Margin (dB)	Meas. Time	Bandwidth	Line
3.393993	29.88	---	56.00	26.12	100.0	9.000	+
3.635427	27.13	---	56.00	28.87	100.0	9.000	+
4.996235	29.44	---	56.00	26.56	100.0	9.000	+
4.996235	---	23.07	46.00	22.93	100.0	9.000	+
5.237669	33.04	---	60.00	26.96	100.0	9.000	+
6.076103	---	29.77	50.00	20.23	100.0	9.000	+
6.304368	32.29	---	60.00	27.71	100.0	9.000	+
6.589699	---	25.65	50.00	24.35	100.0	9.000	+
12.502632	33.58	---	60.00	26.42	100.0	9.000	+
12.590427	---	31.98	50.00	18.02	100.0	9.000	+
12.638713	---	33.27	50.00	16.73	100.0	9.000	+
12.726507	---	32.17	50.00	17.83	100.0	9.000	+



Final Result 1

Frequency (MHz)	QuasiPeak (dB µ V)	Averge (dB µ V)	Limit (dB µ V)	Margin (dB)	Meas. Time	Bandwidth	Line
0.193897	36.78	---	63.87	27.09	100.0	9.000	-
0.255353	32.62	---	61.58	28.96	100.0	9.000	-
0.637257	---	26.04	46.00	19.96	100.0	9.000	-
3.398382	27.52	---	56.00	28.48	100.0	9.000	-
3.446669	31.88	---	56.00	24.12	100.0	9.000	-
4.408015	---	28.40	46.00	17.60	100.0	9.000	-
4.592382	29.04	---	56.00	26.96	100.0	9.000	-
8.038302	33.22	---	60.00	26.78	100.0	9.000	-
12.590427	---	31.69	50.00	18.31	100.0	9.000	-
12.638713	---	32.88	50.00	17.12	100.0	9.000	-
12.726507	---	31.81	50.00	18.19	100.0	9.000	-
12.774794	---	31.82	50.00	18.18	100.0	9.000	-

Annex A EUT Photos

See the document”SNM900-External Photos”.
See the document”SNM900-Internal Photos ”.

ANNEX B Deviations from Prescribed Test Methods

No deviation from Prescribed Test Methods.

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