



TEST REPORT

REPORT NUMBER: I23W00025-BLE RF

ON

Type of Equipment: Cash Drawer Driver Trigger

Type of Designation: NC030

Brand Name: SUNMI

Manufacturer: Shanghai Sunmi Technology Co.,Ltd.

FCC ID: 2AH25NC030

IC: 22621-NC030

ACCORDING TO

FCC Part15, RSS-Gen Issue 5, RSS-247 Issue 2

Chongqing Academy of Information and Communications Technology

Month date, year

Aug.16, 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.: I23W00025-BLE RF

Revision Version

Report Number	Revision	Date
I23W00025-BLE RF	00	2023-07-26
I23W00025-BLE RF	01	2023-08-07
I23W00025-BLE RF	02	2023-08-16

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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	8
3.4.	Internal Identification of AE used during the test	8
3.5.	EUT Test RF Confagle Configuration	8
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

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Report No.: I23W00025-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	37
6.8.	Radiated Emission	48
6.9.	AC Powerline Conducted Emission	64
ANNEX A EUT Photos		67
ANNEX B Deviations from Prescribed Test Methods		68

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1. Test Laboratory

1.1. Testing Location

Name:	Chongqing Academy of Information and Communications Technology
Identifier Number:	CN0044
Designation Number:	CN1239
IC Registration Number:	11590A
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:	2023-06-02
Testing End Date:	2023-06-21

1.4. Signature



2023-08-16

Dong Junxin
(Prepared this test report)

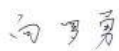
Date



2023-08-16

Li Xu
(Reviewed this test report)

Date



2023-08-16

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

Date

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2. Client Information

2.1. Applicant Information

Company Name:	Shanghai Sunmi Technology Co.,Ltd.
Address /Post:	Room 505, No.388 Song Hu Road, Yang Pu District, Shanghai, China
City:	Shanghai
Country:	China
Telephone:	18826519551
Fax:	N/A
Email:	chenxuanfei@sunmi.com
Contact Person:	chenxuanfei

2.2. Manufacturer Information

Company Name:	Shanghai Sunmi Technology Co.,Ltd.
Address /Post:	Room 505, No.388 Song Hu Road, Yang Pu District, Shanghai, China
City:	Shanghai
Country:	China
Telephone:	18826519551
Fax:	N/A
Email:	chenxuanfei@sunmi.com
Contact Person:	chenxuanfei

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

3.1. About EUT

EUT Description	Cash Drawer Driver Trigg
Model name	NC030
Brand name	SUNMI
GSM Frequency Band	--
WCDMA Frequency Band	--
LTE Frequency Band	--
BLUETOOTH Frequency	2402MHz-2480MHz
WLAN Frequency	--
Type of BLE modulation	GFSK
Extreme Temperature	0 - 45°C
Nominal Voltage	5.0V
Extreme High Voltage	5.25V
Extreme Low Voltage	4.75V

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	MV01E35S00014	MAX_CashBox_BT_MB_V2.0	N/A	2023-06-02
S3	MV01E35S00019	MAX_CashBox_BT_MB_V2.0	N/A	2023-05-31

*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		--

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3.3. Outline of Equipment under Test

3.4. Internal Identification of AE used during the test

AE ID*	Description	dB*
AE1	RF cable	3.1dB

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

dB*: is provided customer.

3.5. EUT Test RF Confagle Configuration

EUT uses Cash Drawer Driver Test working to control emission measurement, Change power level, channel, rate and HT .


Cash Drawer Driver Test V3.3 - Factory

×

Serial Port

USB 串行设备 (COM4)

▼

Close

General

Endurance

Engineering

DTM

Transmitter

Receiver

Channel:

2402 MHz (37)

▼

Transmit Power:

8 dBm

▼

Physical Layer:

LE 1Mbps

▼

Packet Type:

PRBS9

▼

Packet Length (bytes):

37

▲▼

Packets Received:

Stop

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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 Part15	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
RSS-247 Issue 2	Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSS) and Licence-Exempt Local Area Network (LE-LAN) Devices	2017
RSS-Gen Issue 5	General Requirements for Compliance of Radio Apparatus	2021

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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	2023-06-29 2024-06-28
2	Spectrum analyzer	FSW26	104280	--	--	R&S	1 Year	2023-06-29 2024-06-28
3	DC Power Supply	62015L-60-6	L02000001587	--	--	Chroma	1 Year	2023-06-29 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	2023-06-29 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	2022-12-15 2024-12-14
4	Horn antenna	DATE 1152	LM7127	--	--	ETS	2 Year	2022-09-07 2024-09-06
5	Horn antenna	DATE 1012	LM5945	--	--	ETS	2 Year	2022-09-07 2024-09-06
6	Amplifier1	SCU-08F1	8320027	--	--	R&S	1 Year	2023-06-29 2024-06-28
7	Amplifier2	SCU-18F	180093	--	--	R&S	1 Year	2023-06-29 2024-06-28
8	2-Line V-Network	ENV216	102368	--	--	R&S	1 Year	2023-05-28 2024-05-27
9	Test Receiver	ESR 3	101382	03	3.48 SP2	R&S	1 Year	2023-01-29 2024-01-28
10	Test Receiver	ESW 26	101382	00	1.50 SP1	R&S	1 Year	2023-06-29 2024-06-28

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5.3. Climate Chamber

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

5.4. Anechoic chamber Vibration table

No.	Name	Type	SN	Manufacture	Cal. Interval	Cal.Due Date
1	Fully-Anechoic Chamber	FAC5	--	TDK	3 Year	2021-09-23
						2024-09-22
2	Anechoic Chamber	SAC 10	--	TDK	3 Year	2021-08-27
						2024-08-26

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

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6. Test Results

6.1. Summary of Test Results

FCC Rules	IC Rules	Name of Test	Result
15.247(b)	RSS-247 5.4	Maximum Peak Output Power	Pass
15.247(e)	RSS-247 5.2	Peak Power Spectral Density	Pass
15.247(a)	RSS-247 5.2	6dB Occupied Bandwidth	Pass
15.247(a)	RSS-Gen 6.7	99% Occupied Bandwidth	Pass
15.247(d)	RSS-247 5.5	Band Edges Compliance	Pass
15.247(d)	RSS-247 5.5	Transmitter Spurious Emission-Conducted	Pass
15.247/15.205/15.209	RSS-Gen 8.9,8.10	Transmitter Spurious Emission-Radiated	Pass
15.207	RSS-Gen 8.8	AC Powerline Conducted Emission	Pass
Note: The NC030, manufactured by Shanghai Sunmi Technology Co.,Ltd. is a new product for testing.			

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6.2. Peak Output Power-Conducted

Specifications:	FCC 47 Part 15.247(b), RSS-247 Issue 2
DUT Serial Number:	S1
Test conditions:	Ambient Temperature:15℃-35℃ Relative Humidity:30%-60% Air pressure: 86-106kPa
Test Results:	Pass

Limit Level Construction:

Standard	Conducted Limit(dBm)	EIRP Limit(dBm)
FCC 47 Part 15.247,15.205,15.209	<30	<36
RSS-247 5.4(d)	<30	<36

Measurement Uncertainty:

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

Test Procedure

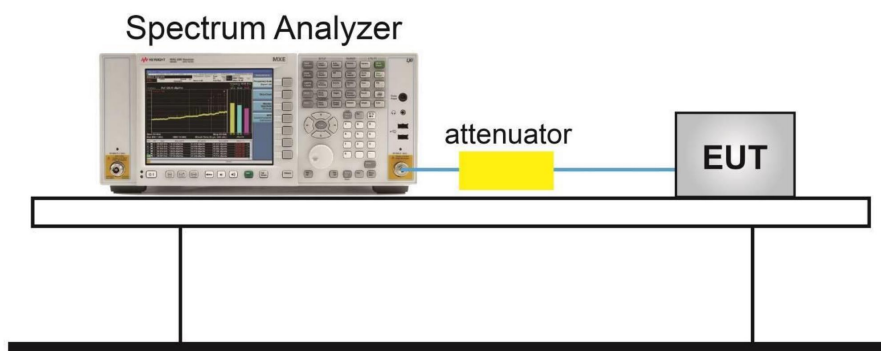
The measurement is according to ANSI C63.10 clause 11.9.1

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

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Antenna gain of EUT

No.	Item(s)	Data
1	Antenna gain of EUT	3.1 dBi
Note: The data is provided by the customer may affect the validity of the test results in this report, and the impact and consequences of this shall be undertaken by the customer.		

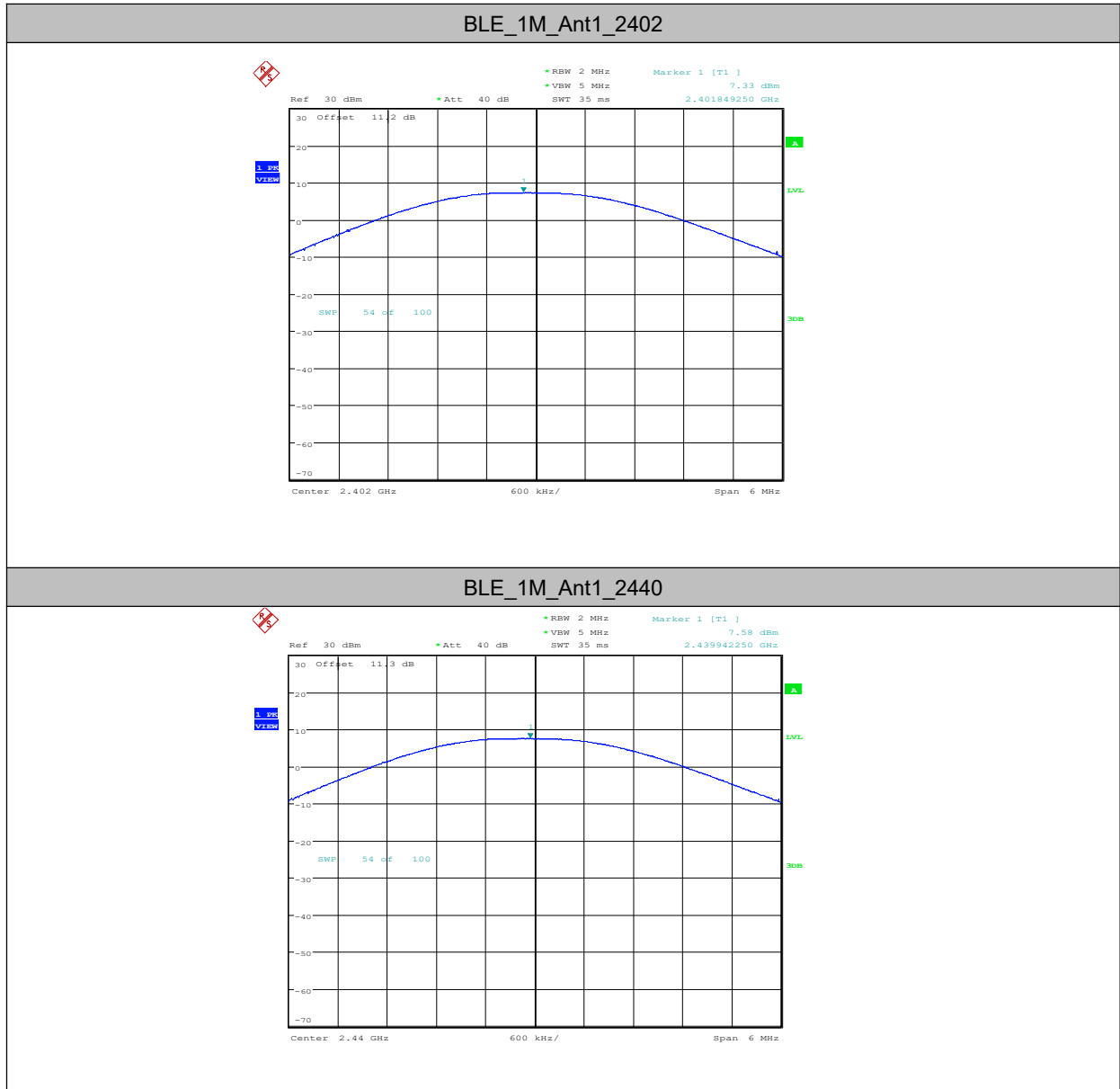
Test Result Peak

TestMode	Antenna	Frequency [MHz]	Conducted Peak Power[dBm]	Conducted Limit[dBm]	EIRP[dBm]	EIRP Limit[dBm]	Verdict
BLE_1M	Ant1	2402	7.33	≤30	10.43	≤36	PASS
		2440	7.58	≤30	10.68	≤36	PASS
		2480	7.37	≤30	10.47	≤36	PASS
BLE_2M	Ant1	2402	7.43	≤30	10.53	≤36	PASS
		2440	7.58	≤30	10.68	≤36	PASS
		2480	7.39	≤30	10.49	≤36	PASS

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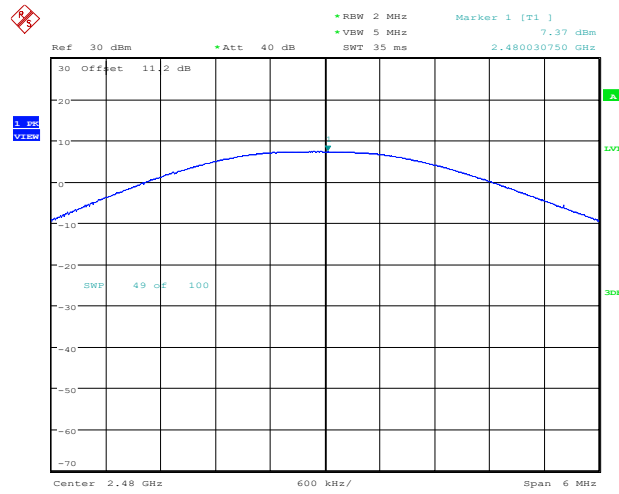
Test graphs as below



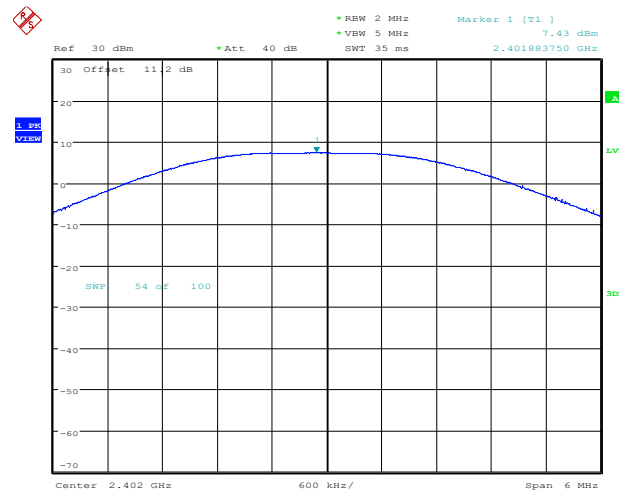
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BLE_1M_Ant1_2480



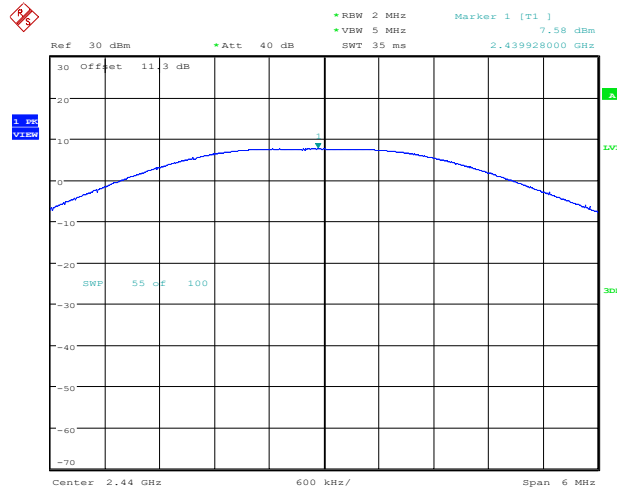
BLE_2M_Ant1_2402



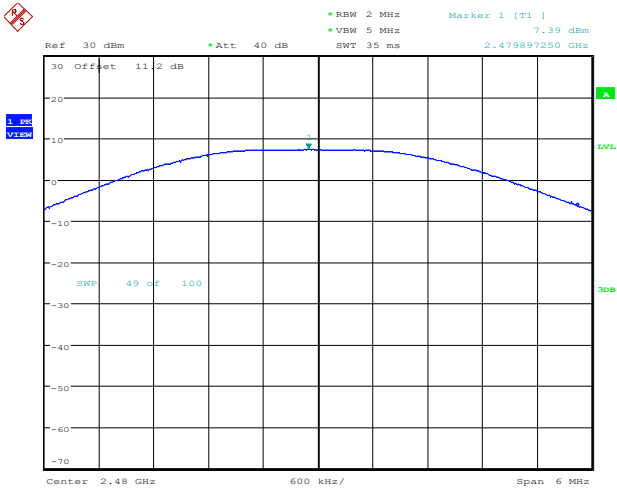
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BLE_2M_Ant1_2440



BLE_2M_Ant1_2480



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6.3. Peak Power Spectral Density

Specifications:	FCC 47 Part 15.247(e), RSS-247 Issue 2
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(e)	$\leq 8\text{dBm}/3\text{ kHz}$
RSS-247 5.2(b)	$\leq 8\text{dBm}/3\text{ kHz}$

Measurement Uncertainty:

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

Test procedures

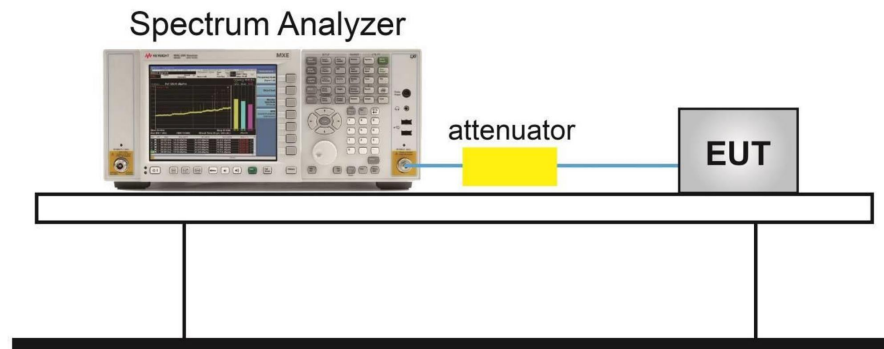
The measurement is according to ANSI C63.10 clause 11.10.

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.

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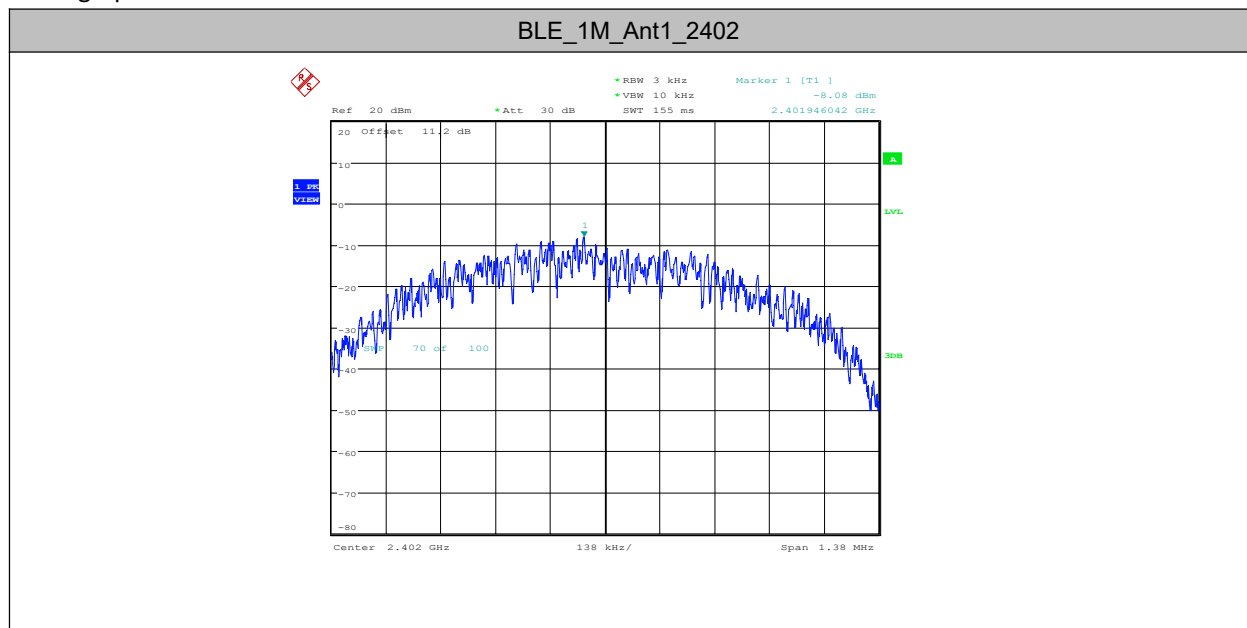
Test Setup



Measurement Results

TestMode	Antenna	Frequency [MHz]	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
BLE_1M	Ant1	2402	-8.08	≤8.00	PASS
		2440	-7.82	≤8.00	PASS
		2480	-8.22	≤8.00	PASS
BLE_2M	Ant1	2402	-10.54	≤8.00	PASS
		2440	-10.41	≤8.00	PASS
		2480	-10.75	≤8.00	PASS

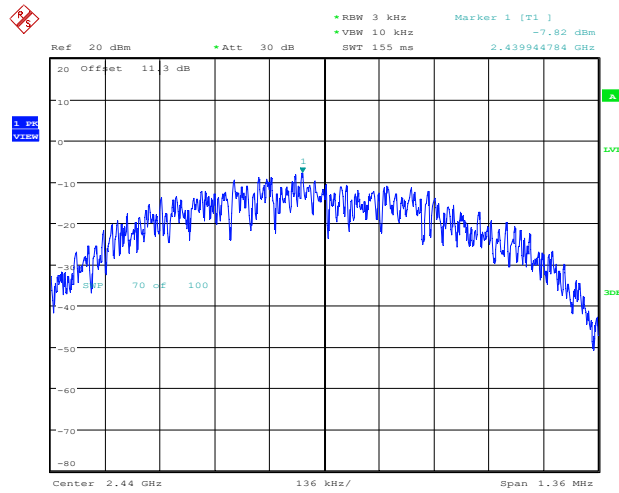
Test graphs as below



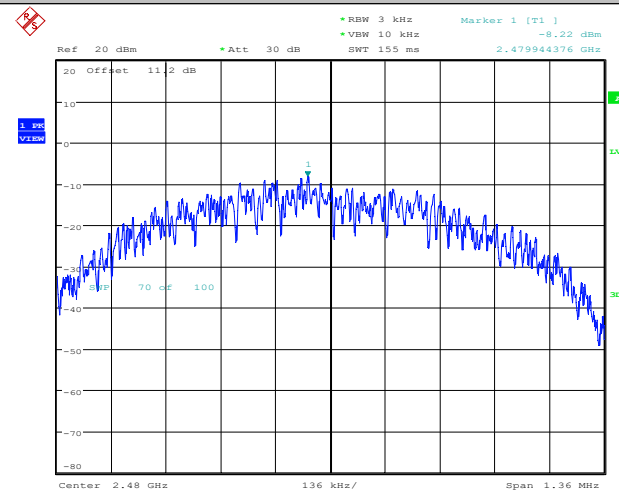
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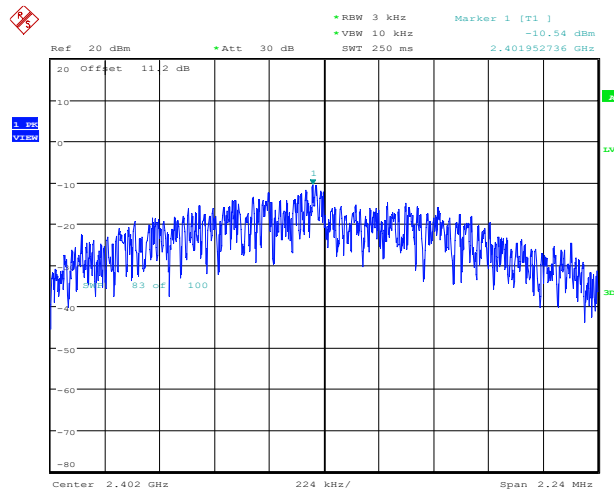
BLE_1M_Ant1_2440



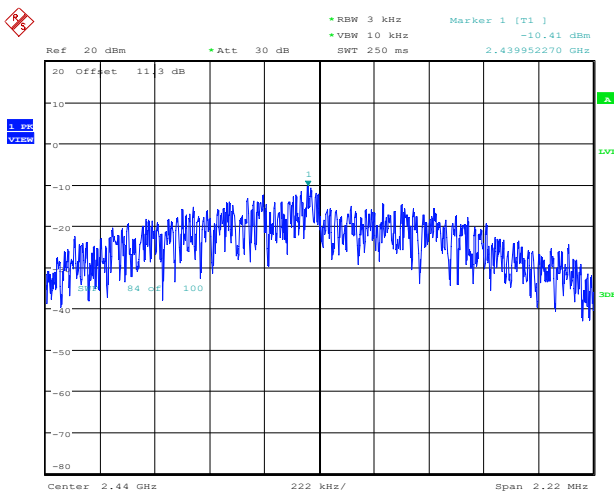
BLE_1M_Ant1_2480



BLE_2M_Ant1_2402



BLE_2M_Ant1_2440

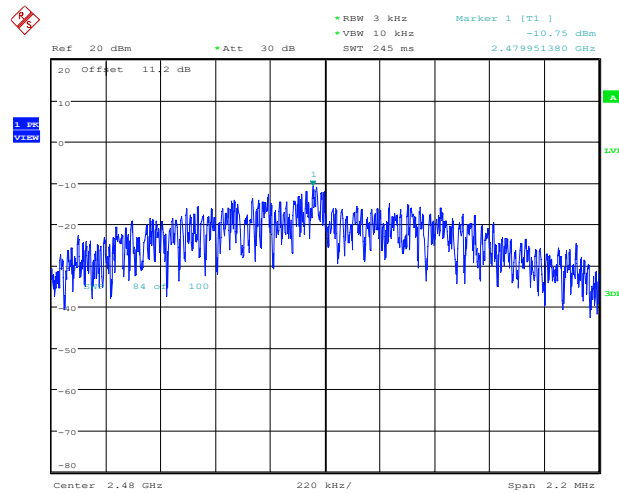


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BLE_2M_Ant1_2480



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6.4. 6dB Bandwidth

Specifications:	FCC 47 Part 15.247 (a) (2), RSS-247 Issue 2
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 (a) (2)	$\geq 500\text{kHz}$
RSS-247 5.2(a)	$\geq 500\text{kHz}$

Measurement Uncertainty:

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

Test procedures

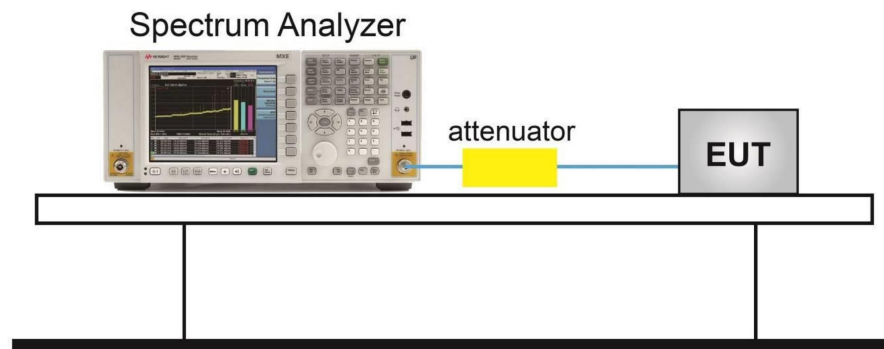
The measurement is according to ANSI C63.10 clause 11.8.

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.

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Test Setup



Measurement Result

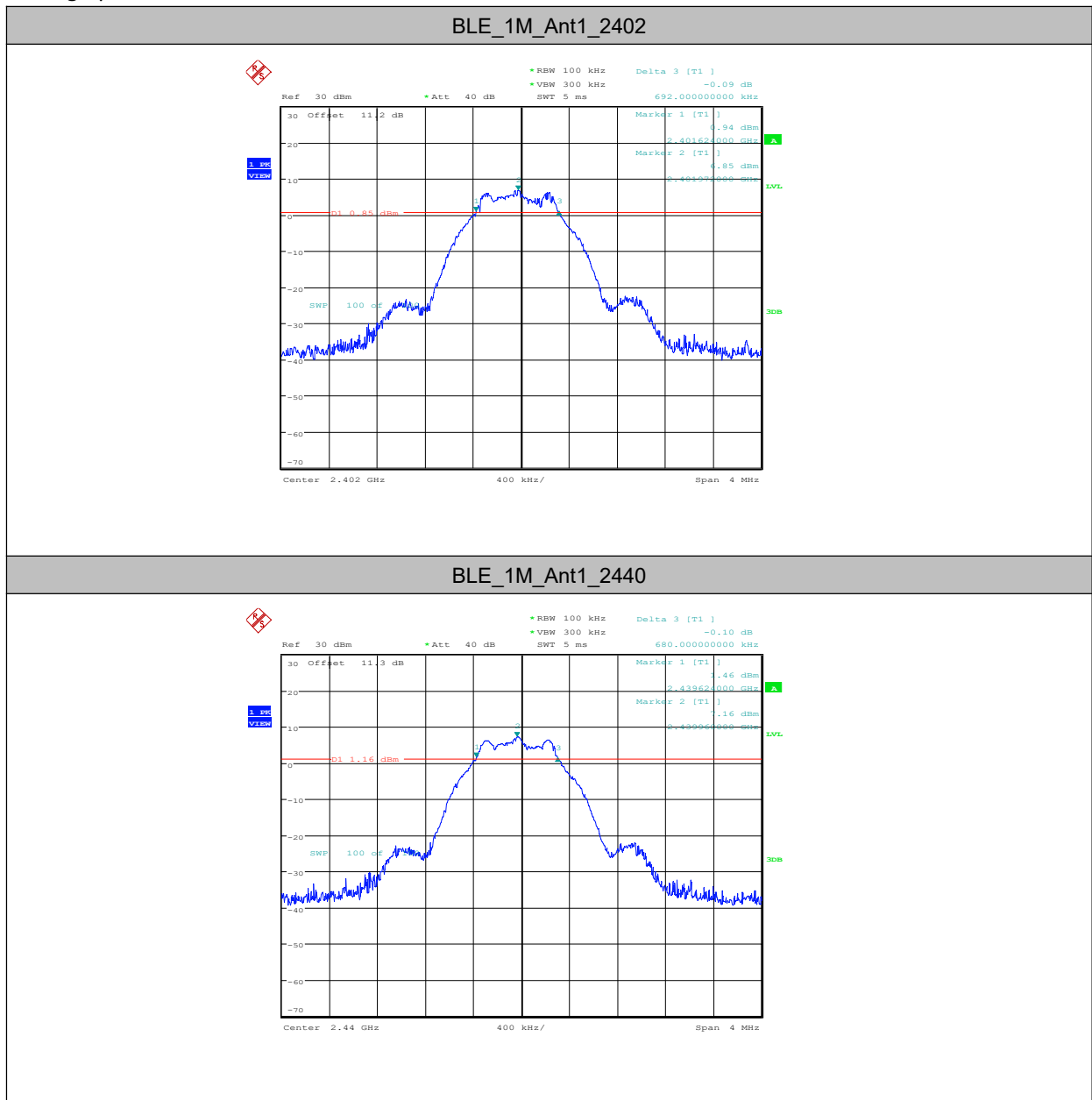
TestMode	Antenna	Frequency [MHz]	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	0.69	2401.62	2402.32	0.5	PASS
		2440	0.68	2439.62	2440.30	0.5	PASS
		2480	0.68	2479.63	2480.31	0.5	PASS
BLE_2M	Ant1	2402	1.12	2401.41	2402.53	0.5	PASS
		2440	1.11	2439.42	2440.53	0.5	PASS
		2480	1.10	2479.42	2480.53	0.5	PASS

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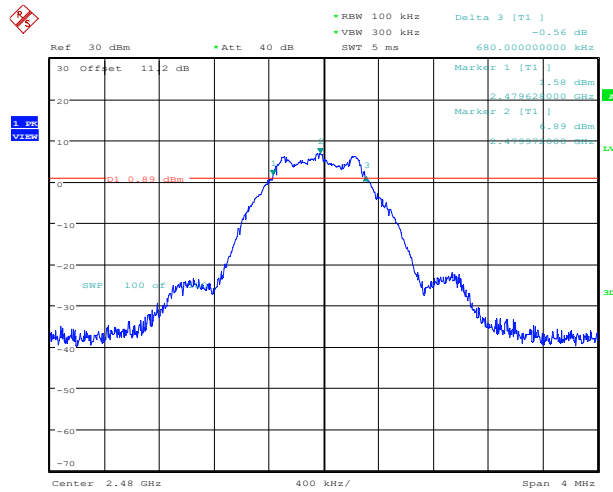


Test graphs as below



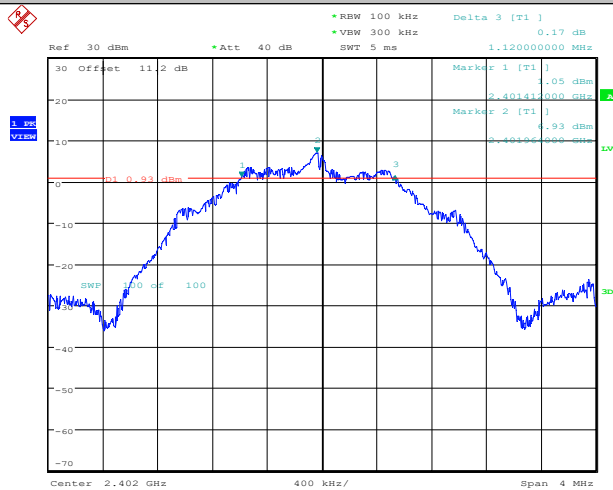
Page 25 of 68

BLE_1M_Ant1_2480



Cell: 8 MHz 2023-08-03-00

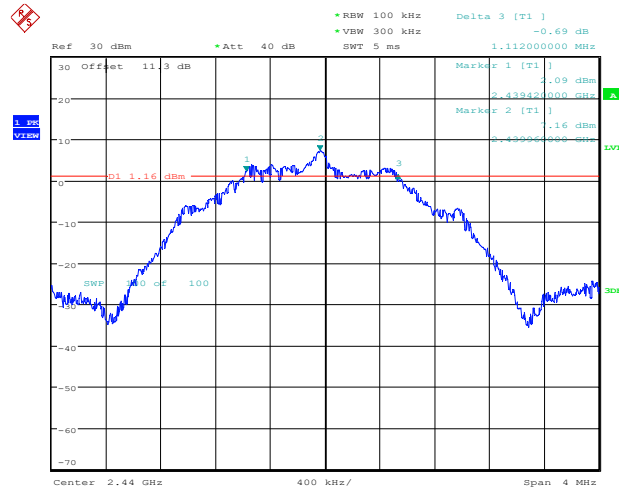
BLE_2M_Ant1_2402



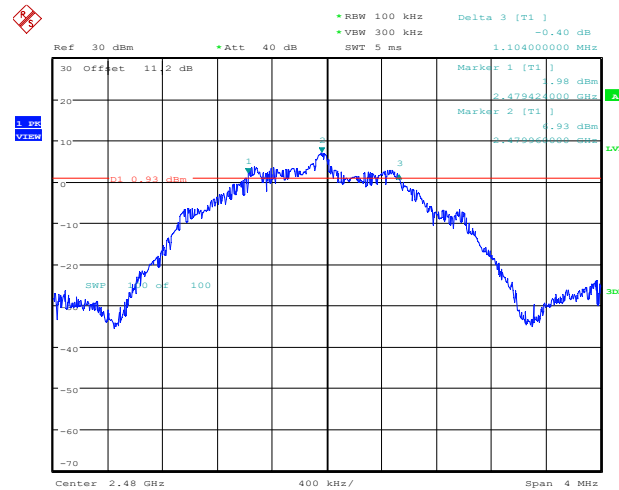
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BLE_2M_Ant1_2440



BLE_2M_Ant1_2480



6.5. 99% Occupied Bandwidth

Specifications:	15.247(a), RSS-Gen Issue 5
DUT Serial Number:	S1
Test conditions:	Ambient Temperature:15℃-35℃ Relative Humidity:30%-60% Air pressure: 86-106kPa
Test Results:	Pass

Limit Level Construction:

Standard	Limit
15.247(a)	N/A
RSS-Gen 6.7	N/A

Measurement Uncertainty:

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

Test procedures

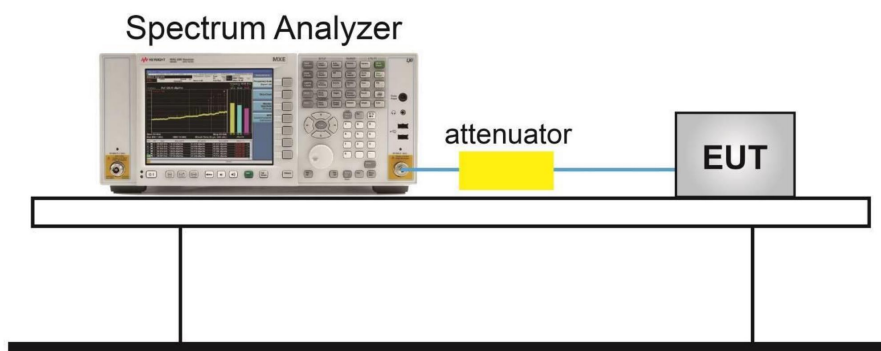
The measurement is according to ANSI C63.10 clause 6.9.3.

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.

Test setup

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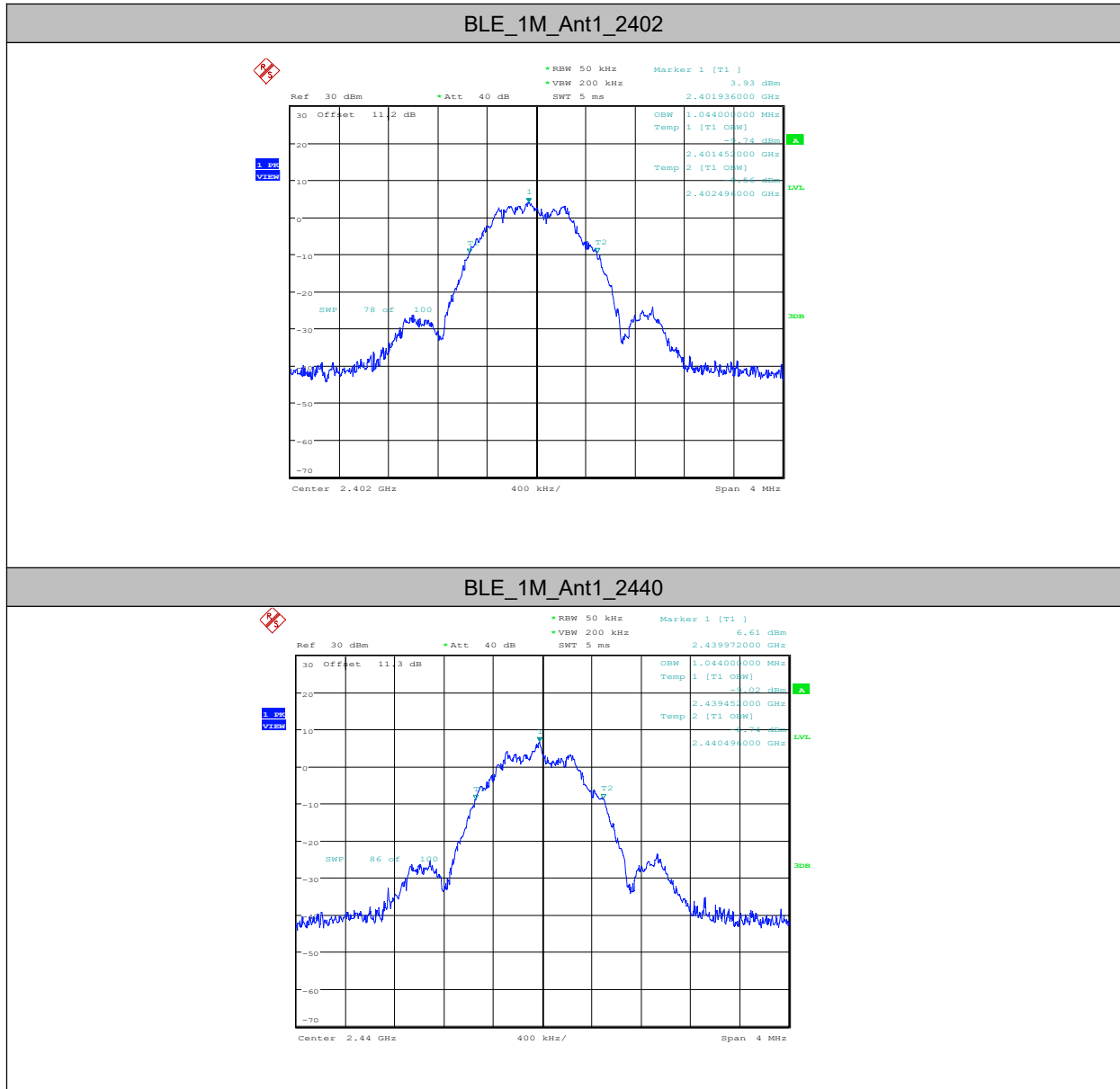
Measurement Result

TestMode	Antenna	Frequency [MHz]	OCB [MHz]	FL[MHz]	FH[MHz]
BLE_1M	Ant1	2402	1.044	2401.4520	2402.4960
		2440	1.044	2439.4520	2440.4960
		2480	1.044	2479.4560	2480.5000
BLE_2M	Ant1	2402	2.044	2400.9600	2403.0040
		2440	2.04	2438.9640	2441.0040
		2480	2.048	2478.9600	2481.0080

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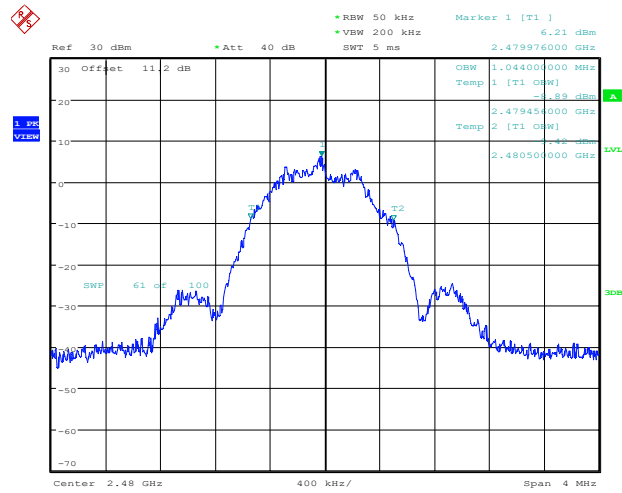
Test graphs as below



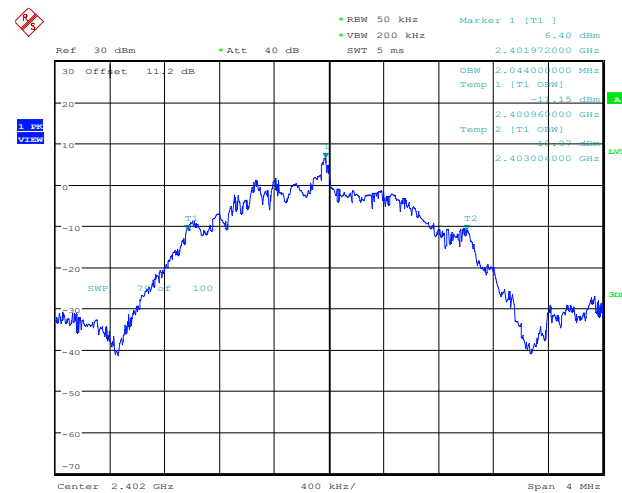
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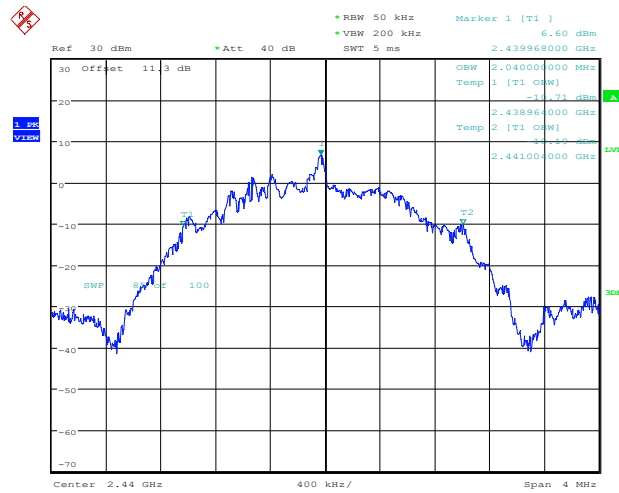
BLE_1M_Ant1_2480



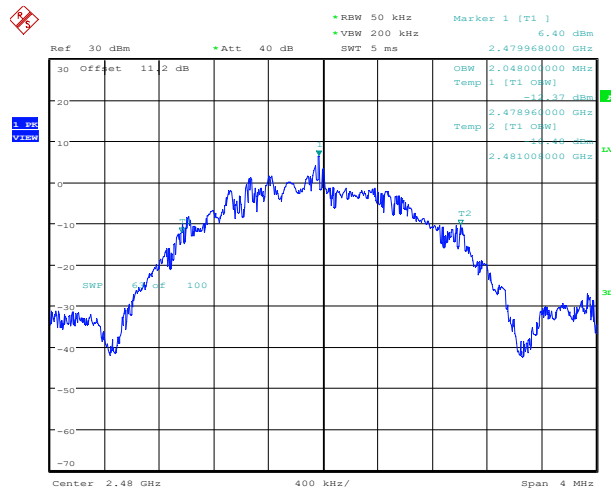
BLE_2M_Ant1_2402



BLE_2M_Ant1_2440



BLE_2M_Ant1_2480



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6.6. Frequency Band Edges-Conducted

Specifications:	FCC 47 Part 15.247(d), RSS-247 Issue 2
DUT Serial Number:	S1
Test conditions:	Ambient Temperature:15℃-35℃ Relative Humidity:30%-60% Air pressure: 86-106kPa
Test Results:	Pass

Limit Level Construction:

Standard	Limit(dBc)
FCC 47 Part 15.247(d)	>20
RSS-247 5.5	>20

Measurement Uncertainty:

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

Test procedures

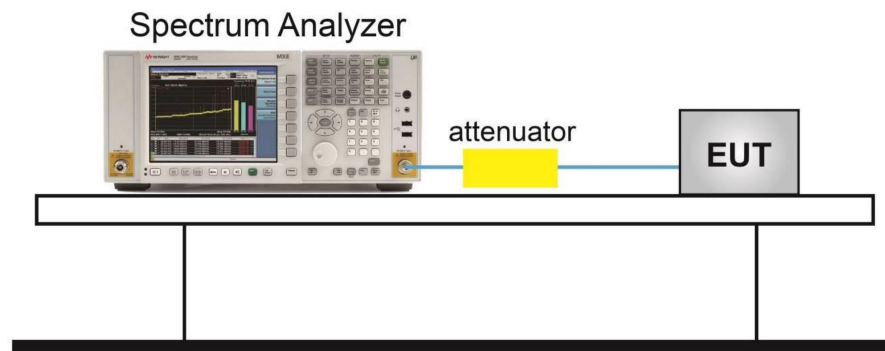
The measurement is according to ANSI C63.10 clause 11.13.2

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 $[10 \log (\text{OBW}/\text{RBW})]$ 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.

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Test Setup



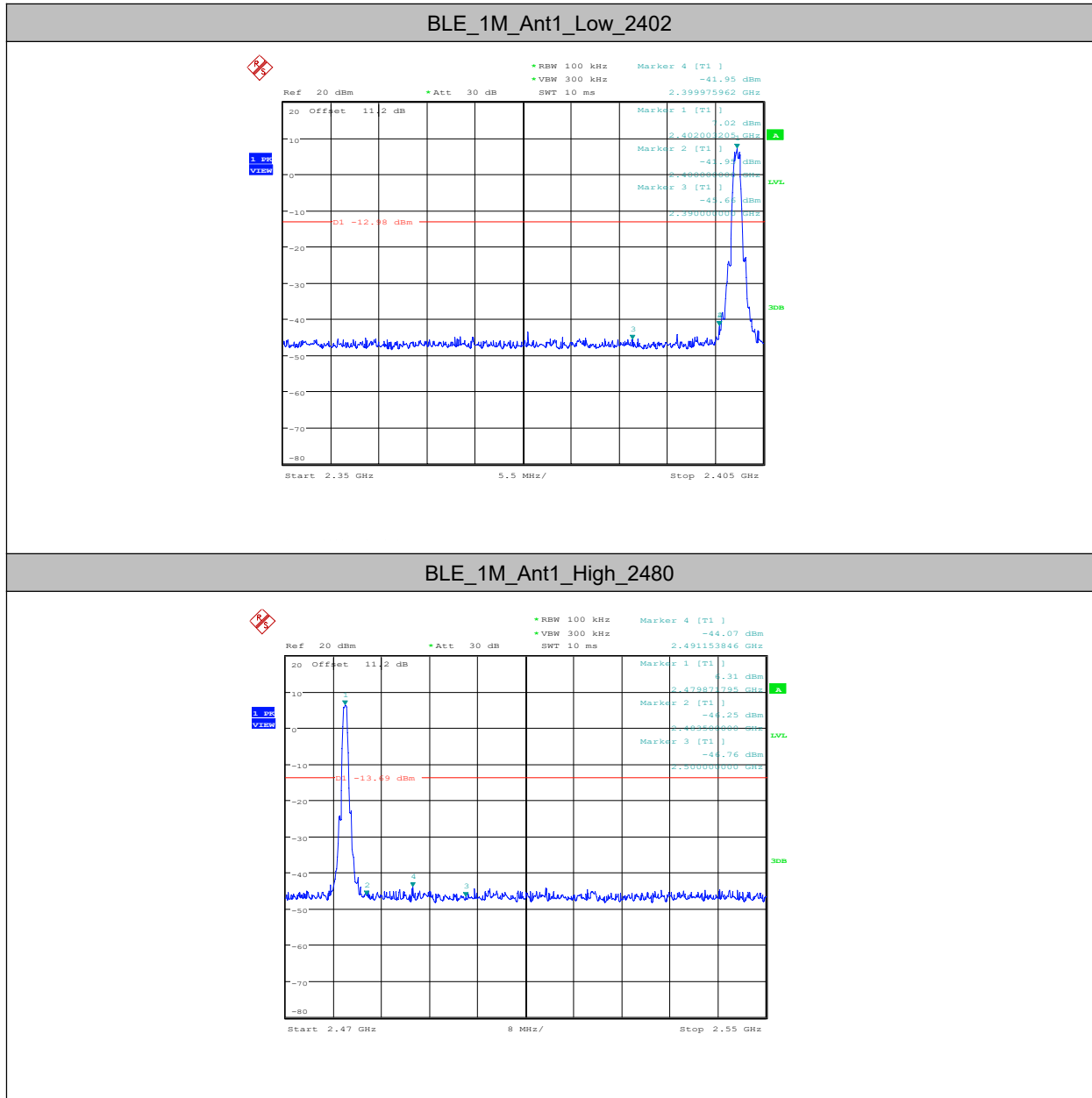
Measurement Result

TestMode	Antenna	ChName	Frequency [MHz]	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	Low	2402	7.02	-41.95	≤-12.98	PASS
		High	2480	6.31	-44.07	≤-13.69	PASS
BLE_2M	Ant1	Low	2402	7.09	-26.2	≤-12.91	PASS
		High	2480	7.05	-43.59	≤-12.95	PASS

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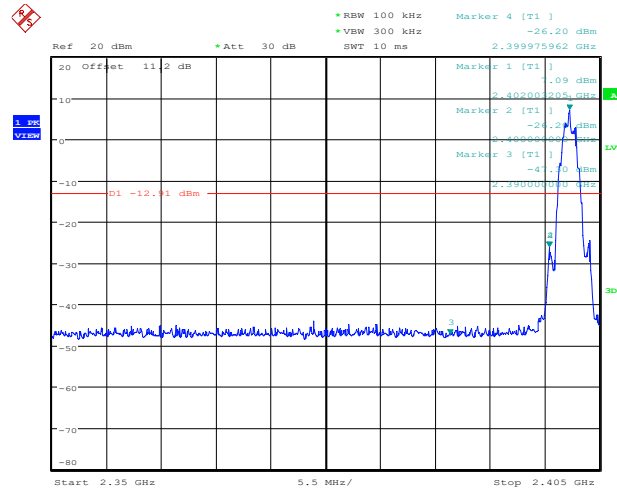
Test graphs as below



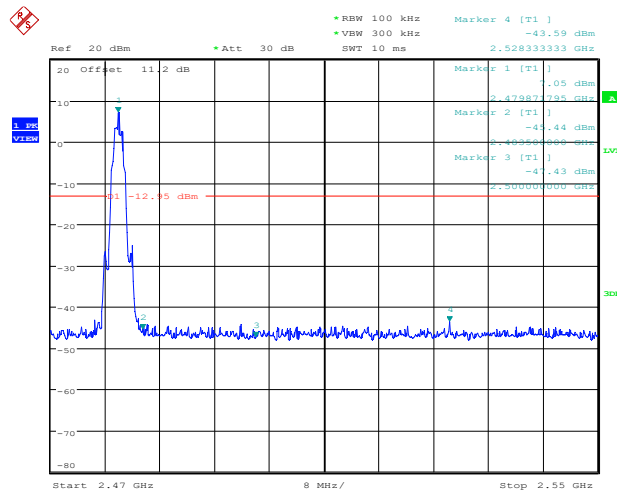
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BLE_2M_Ant1_Low_2402



BLE_2M_Ant1_High_2480



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6.7. Conducted Emission

Specifications:	FCC 47 Part 15.247(d), RSS-247 Issue 2
DUT Serial Number:	S1,S3
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
RSS-247 5.5	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

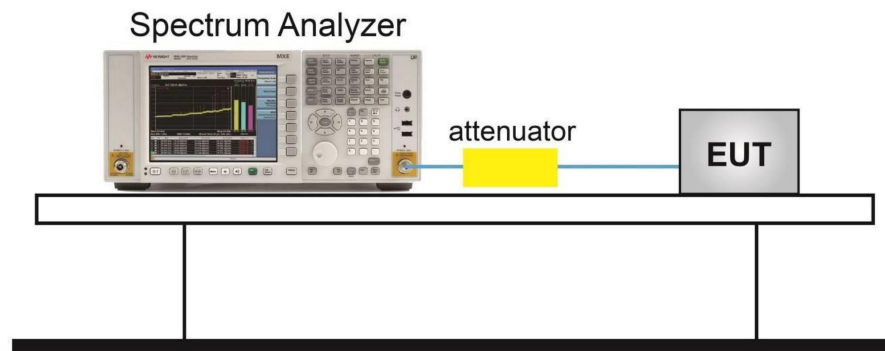
1. Set the center frequency and span to encompass frequency range to be measured.
2. Set the RBW = 100 kHz.
3. Set the VBW $\geq [3 \times \text{RBW}]$.

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4. Detector = peak.
5. Sweep time = auto couple.
6. Trace mode = max hold.
7. Allow trace to fully stabilize.
8. Use the peak marker function to determine the maximum amplitude level.

Test Setup



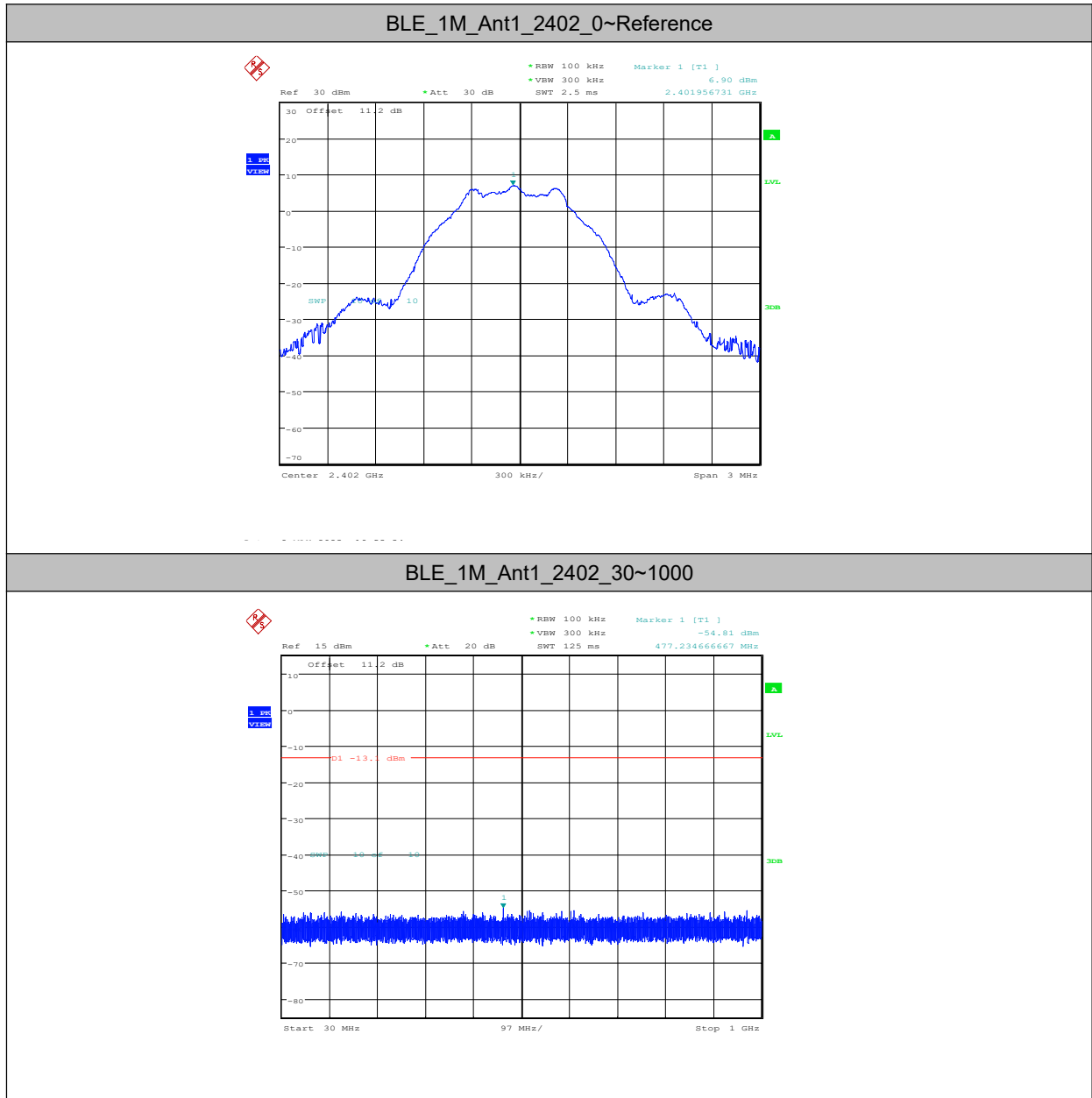
Measurement Result

TestMode	Antenna	Frequency [MHz]	FreqRange [MHz]	RefLevel [dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	2402	Reference	6.90	6.90	---	PASS
			30~1000	6.90	-54.81	≤-13.1	PASS
			1000~26500	6.90	-51.3	≤-13.1	PASS
		2440	Reference	7.08	7.08	---	PASS
			30~1000	7.08	-55.65	≤-12.92	PASS
			1000~26500	7.08	-51.27	≤-12.92	PASS
		2480	Reference	6.86	6.86	---	PASS
			30~1000	6.86	-54.02	≤-13.14	PASS
			1000~26500	6.86	-51.27	≤-13.14	PASS
BLE_2M	Ant1	2402	Reference	6.96	6.96	---	PASS
			30~1000	6.96	-55.38	≤-13.04	PASS
			1000~26500	6.96	-51.42	≤-13.04	PASS
		2440	Reference	7.09	7.09	---	PASS
			30~1000	7.09	-55.22	≤-12.91	PASS
			1000~26500	7.09	-50.51	≤-12.91	PASS
		2480	Reference	6.87	6.87	---	PASS
			30~1000	6.87	-54.88	≤-13.13	PASS
			1000~26500	6.87	-49.73	≤-13.13	PASS

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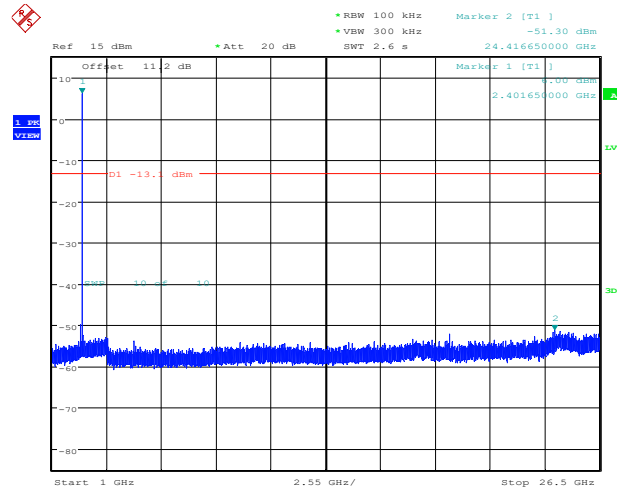
Test graphs as below



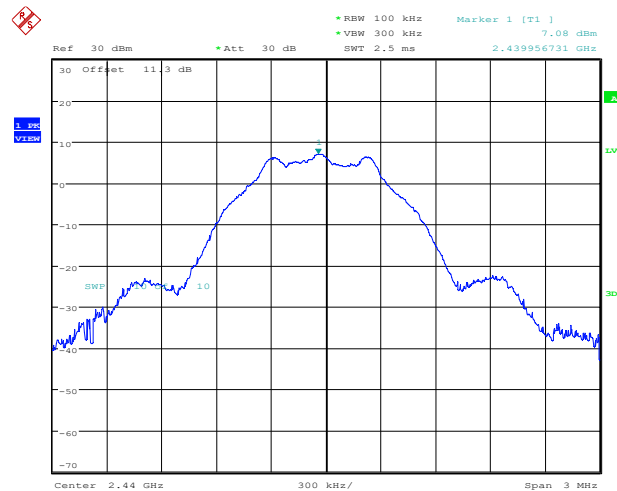
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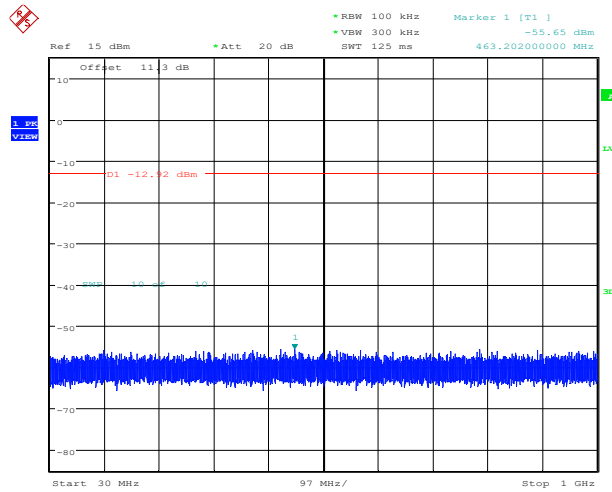
BLE_1M_Ant1_2402_1000~26500



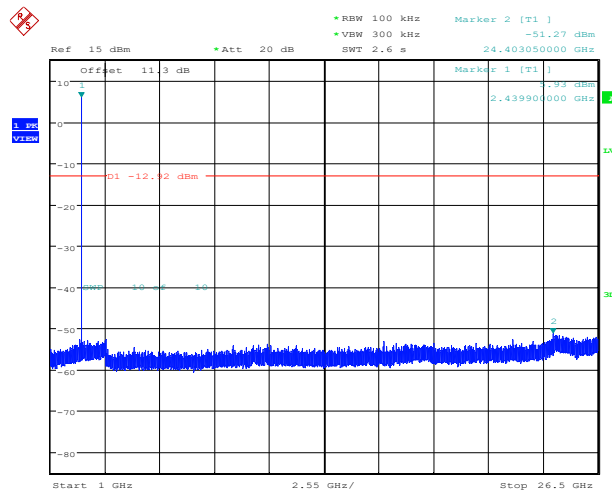
BLE_1M_Ant1_2440_0~Reference



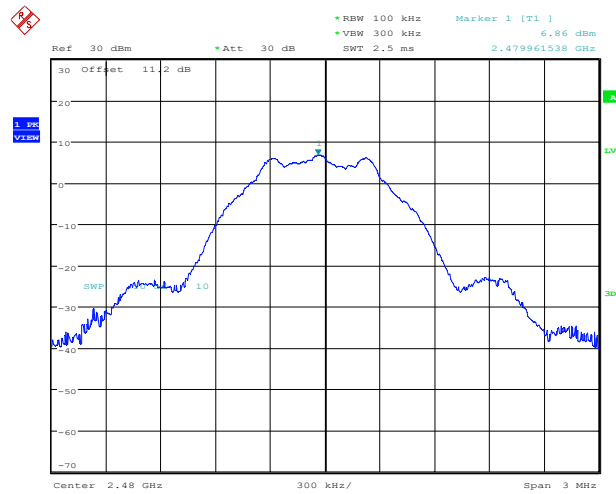
BLE_1M_Ant1_2440_30~1000



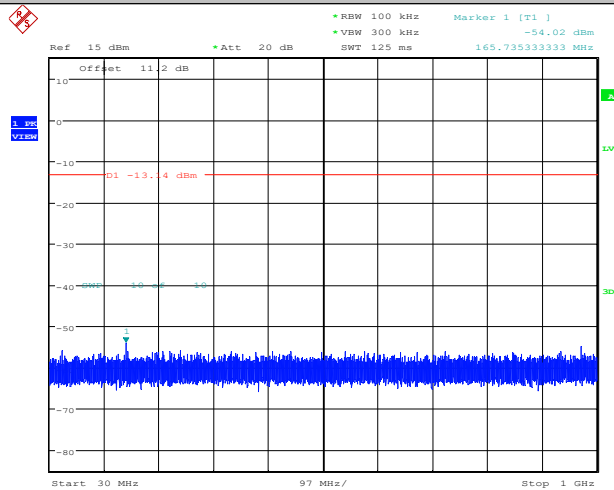
BLE_1M_Ant1_2440_1000~26500



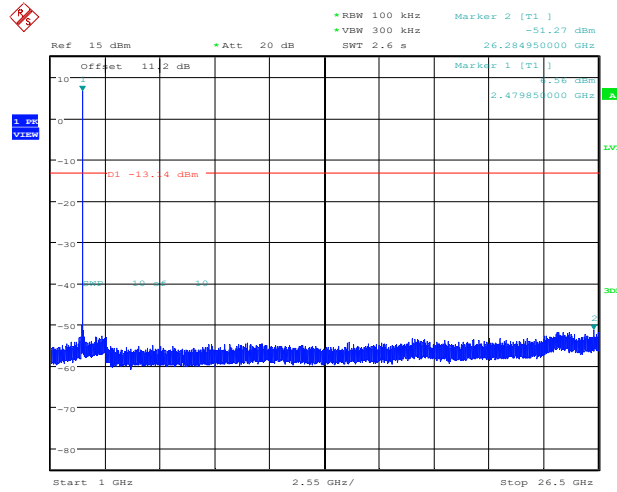
BLE_1M_Ant1_2480_0~Reference



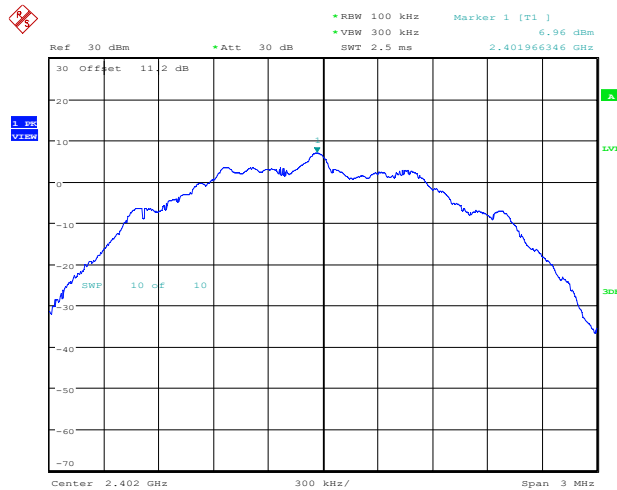
BLE_1M_Ant1_2480_30~1000



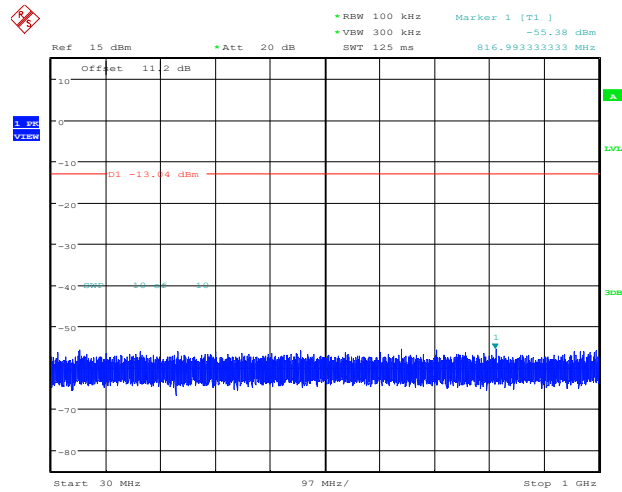
BLE_1M_Ant1_2480_1000~26500



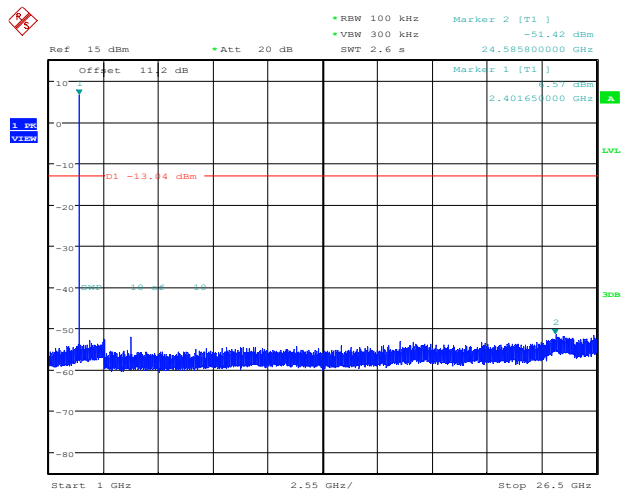
BLE_2M_Ant1_2402_0~Reference

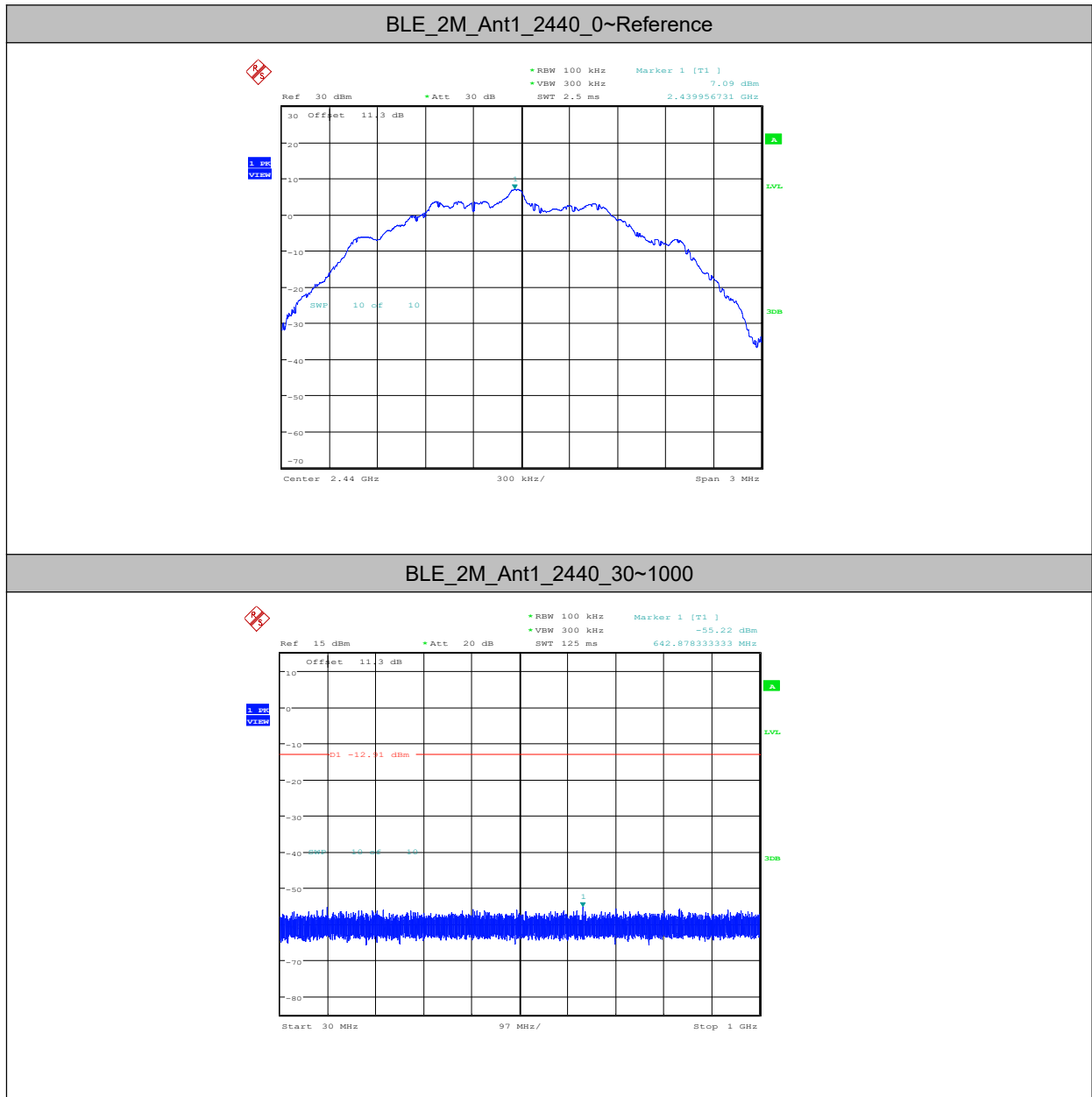


BLE_2M_Ant1_2402_30~1000

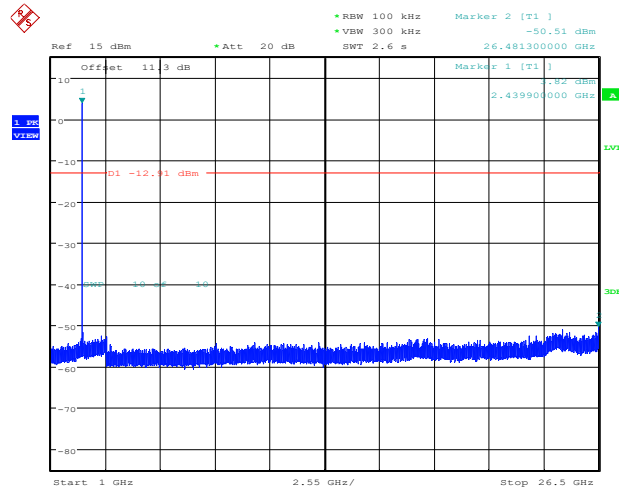


BLE_2M_Ant1_2402_1000~26500

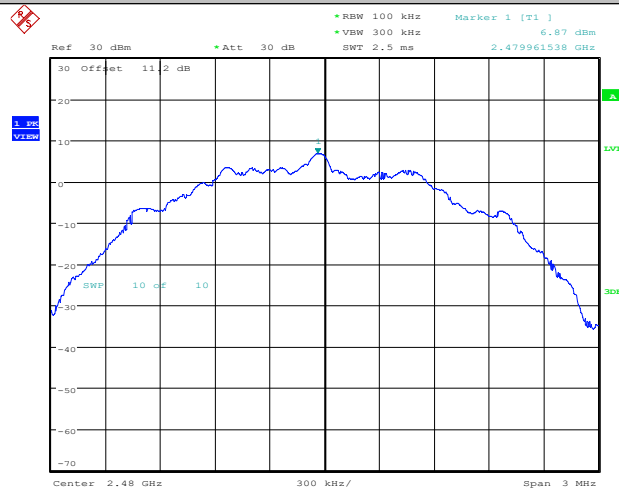




BLE_2M_Ant1_2440_1000~26500

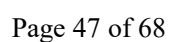
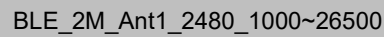


BLE_2M_Ant1_2480_0~Reference





BLE_2M_Ant1_2480_30~1000



6.8. Radiated Emission

Specifications:	FCC 47 Part 15.247(d),15.205(a),15.209(a), RSS-Gen Issue 5
DUT Serial Number:	S3
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)15.247(d),15.205(a),15.209(a)	20dB below peak output power in 100KHz bandwidth
RSS-Gen 8.9,8.10	20dB below peak output power in 100KHz bandwidth

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).
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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

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216~960	200	46
Above 960	500	54

Test Method

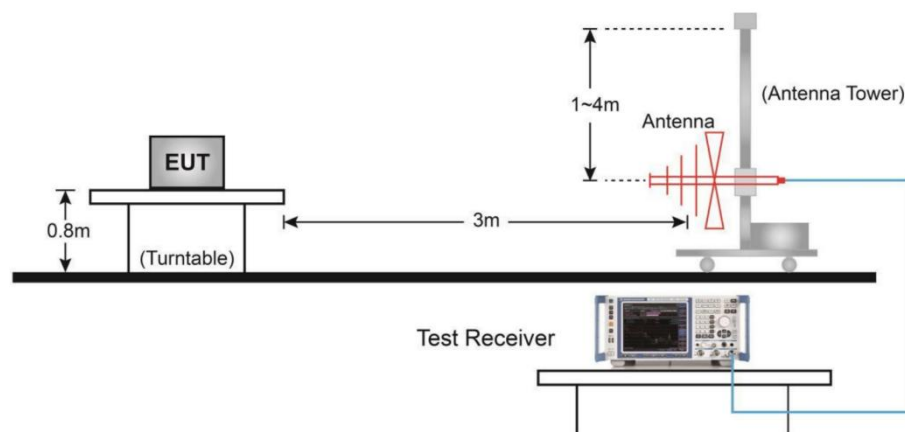
Portable, small, lightweight, or modular devices that may be handheld, worn on the body, or placed on a table during operation shall be positioned on a non-conducting platform, the top of which is 80 cm above the reference ground plane. The preferred area occupied by the EUT arrangement is 1 m by 1.5 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	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

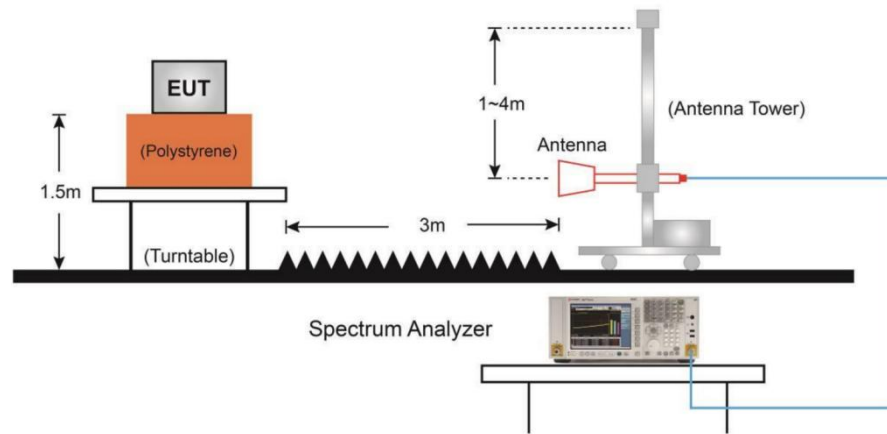
Below 1GHz Test Setup



Above 1GHz Test Setup

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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.

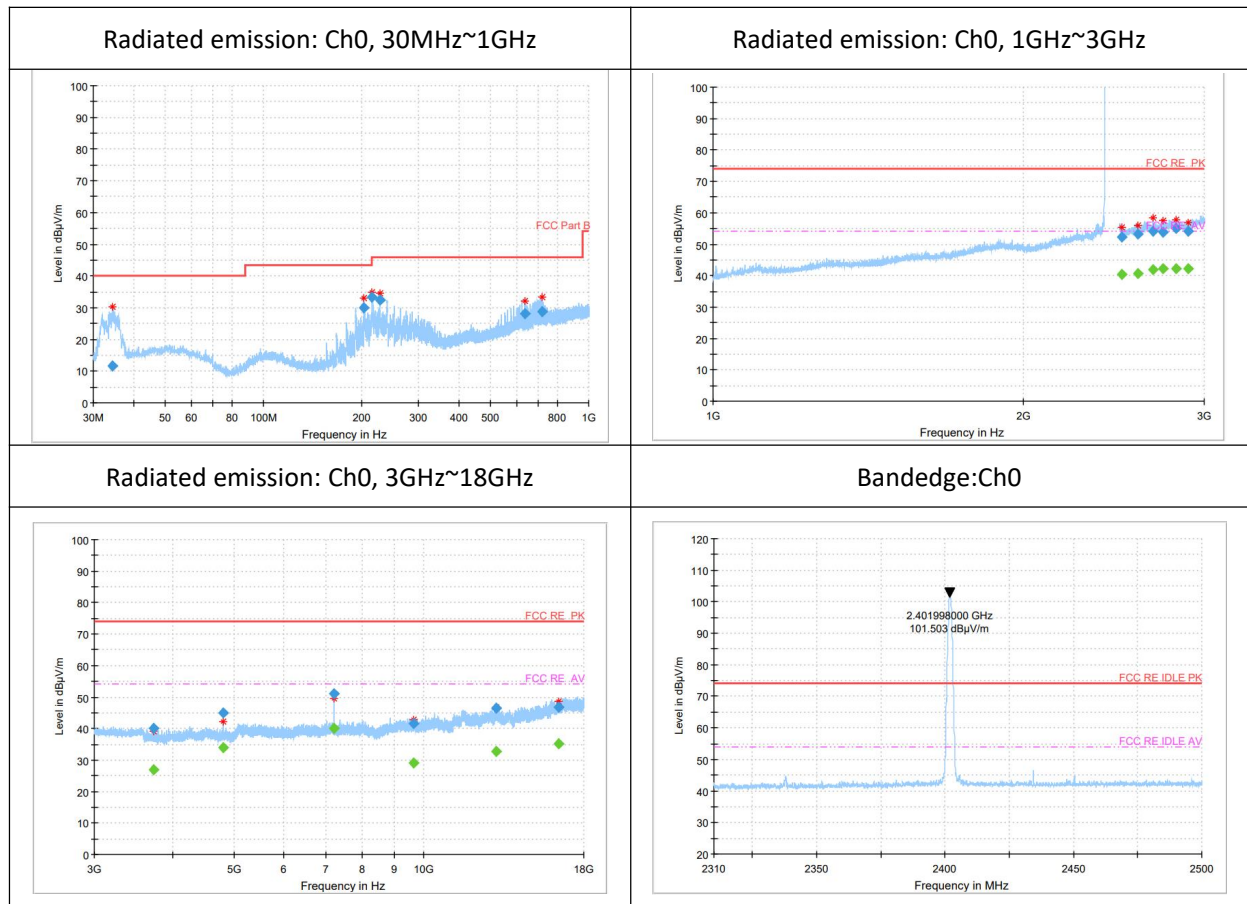
The measurement results are obtained as described below:

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

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

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

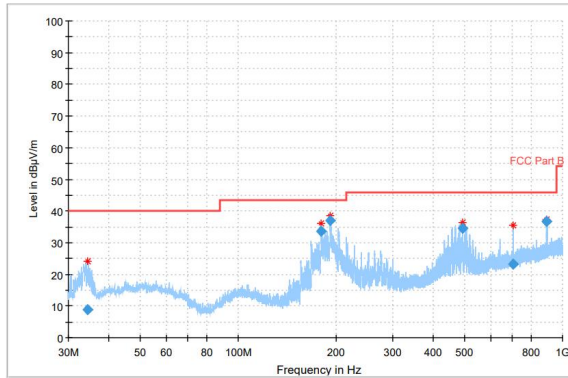
1M:



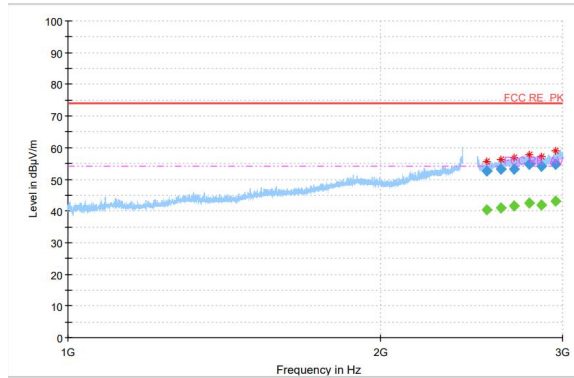
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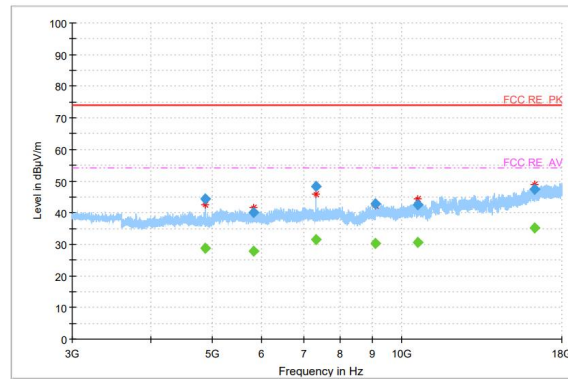
Radiated emission: Ch17, 30MHz~1GHz



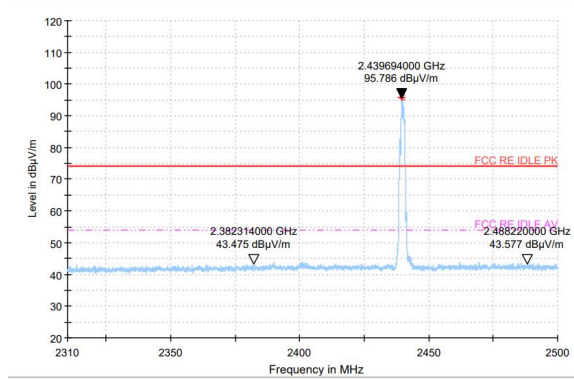
Radiated emission: Ch17, 1GHz~3GHz



Radiated emission: Ch17, 3GHz~18GHz



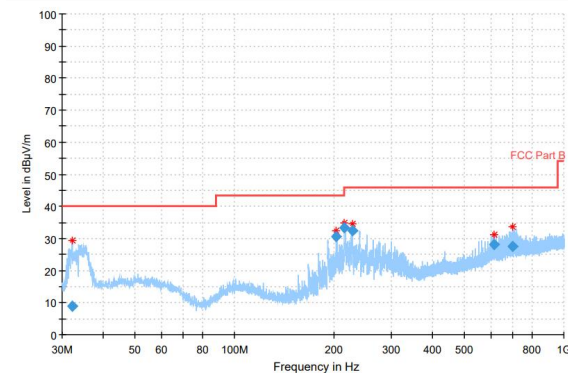
Bandedge: Ch17



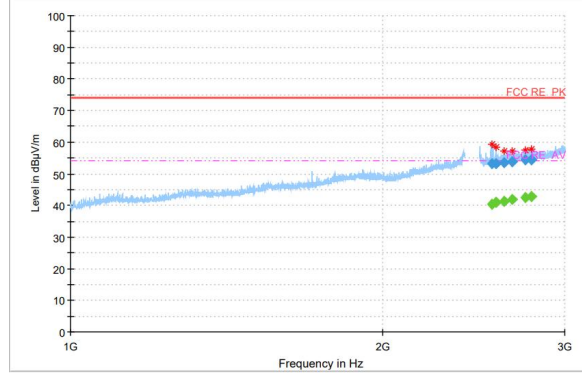
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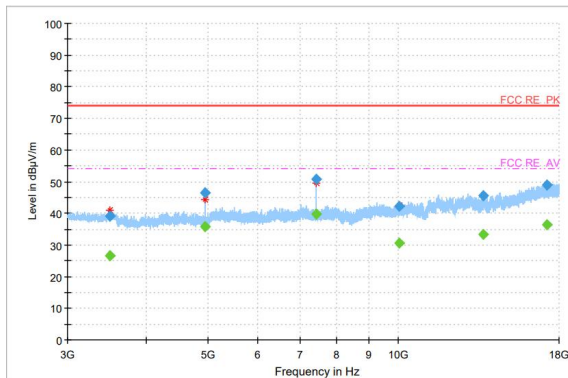
Radiated emission: Ch39, 30MHz~1GHz



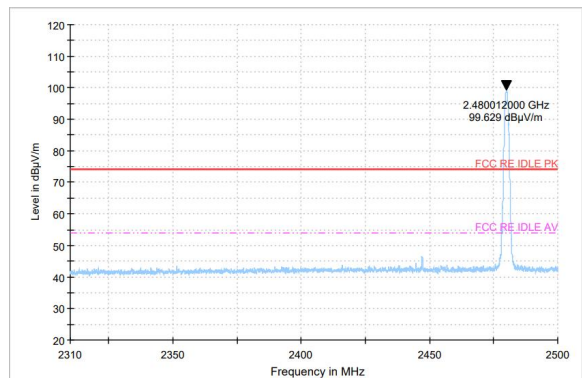
Radiated emission: Ch39, 1GHz~3GHz



Radiated emission: Ch39, 3GHz~18GHz



Bandedge:Ch39

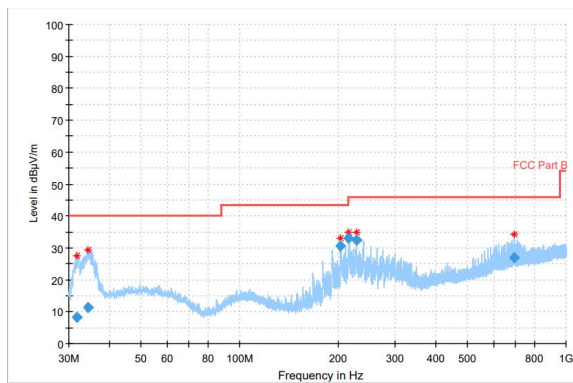


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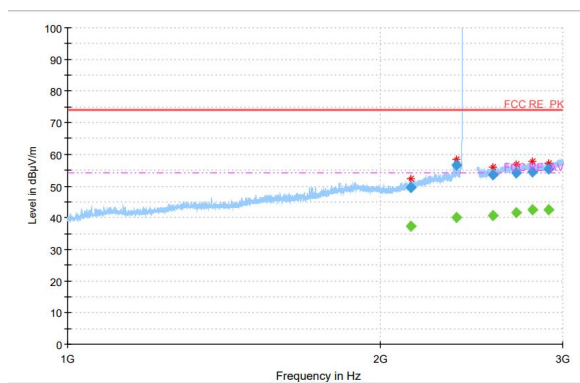
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2M:

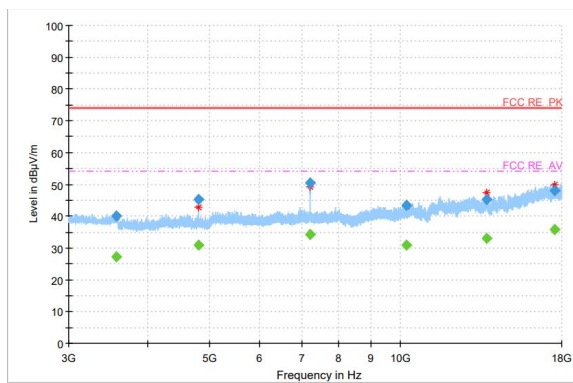
Radiated emission: Ch0, 30MHz~1GHz



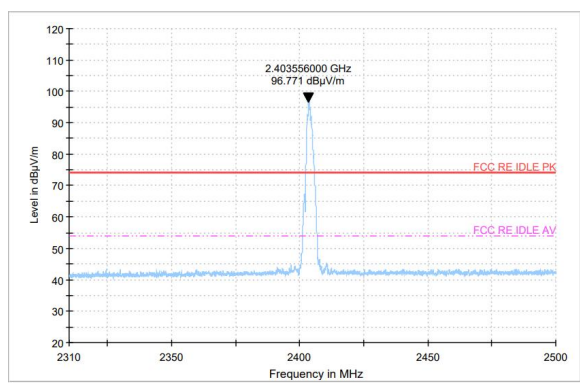
Radiated emission: Ch0, 1GHz~3GHz

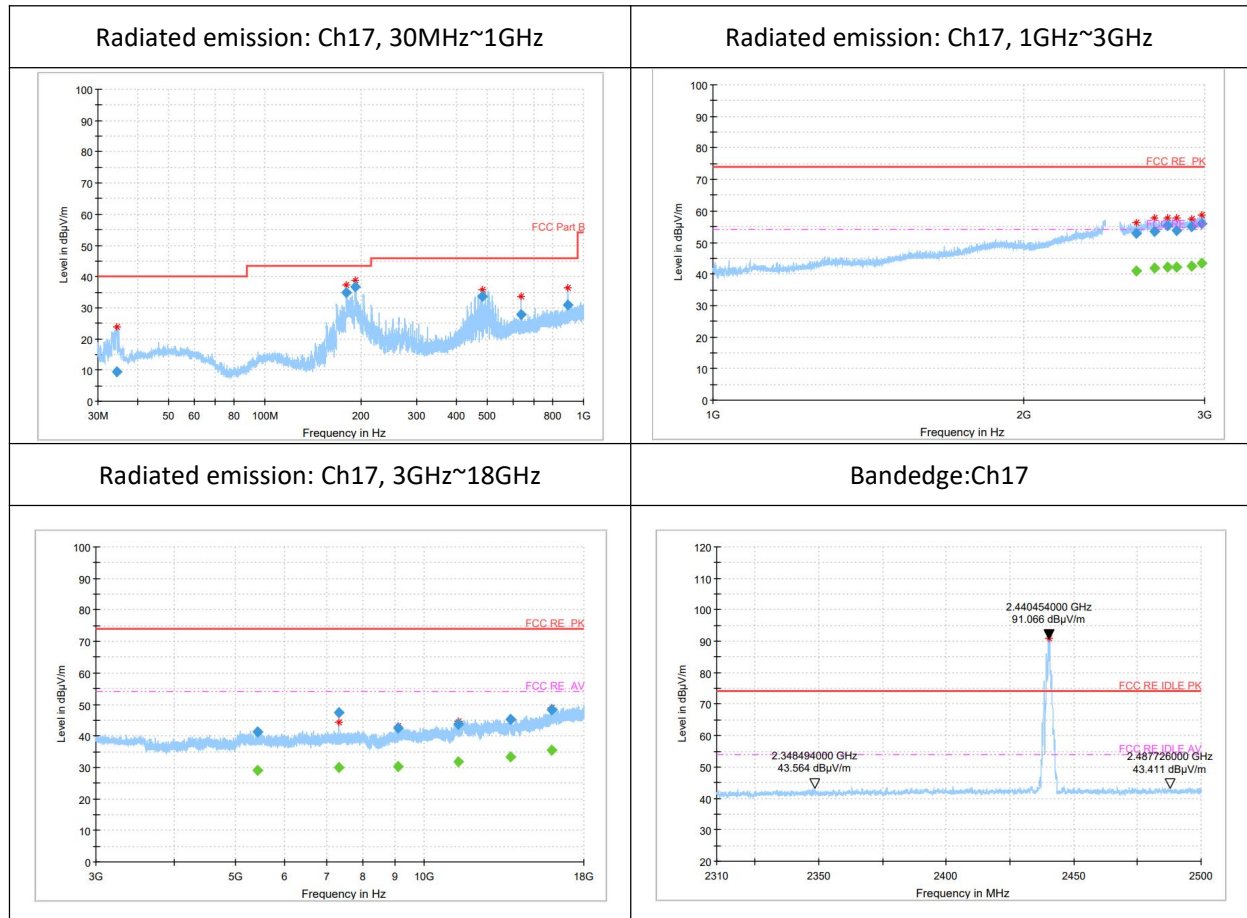


Radiated emission: Ch0, 3GHz~18GHz



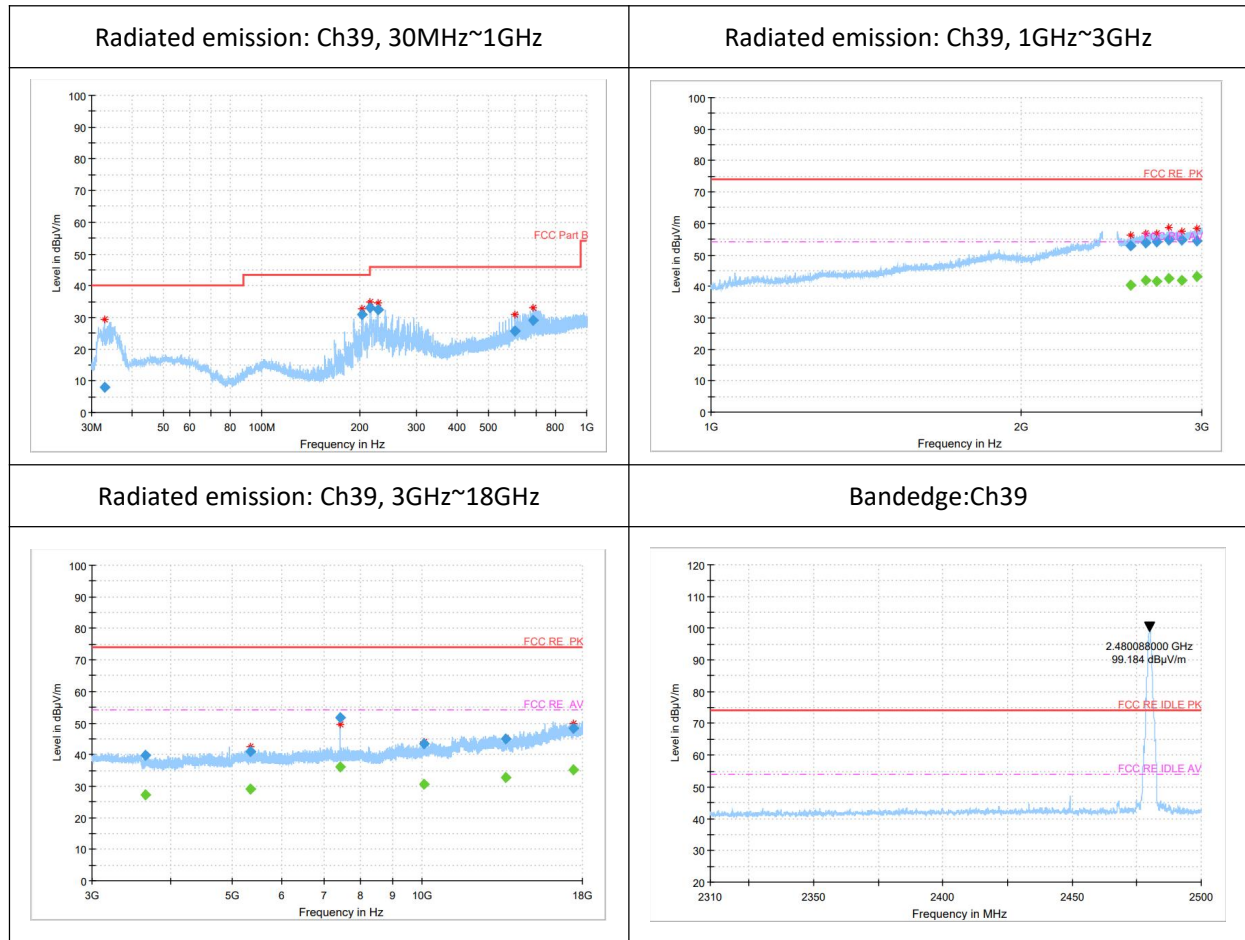
Bandedge:Ch0





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Note1:

1. Only data in worst mode is provided.
2. The out-of- limit signal in the picture is the main frequency signal.
3. 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
34.3	11.65	-15	26.65	V
204.2	30.11	-13	43.11	H
216.0	33.24	-12	45.24	H
228.0	32.34	-12	44.34	H
635.9	28.18	-3	31.18	H
720.3	28.83	-2	30.83	H

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

Frequency (MHz)	Result (dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Polarity
2497.0	52.2	16	36.2	H
2587.0	53.2	16	37.2	H
2674.8	54.17	17	37.17	V
2738.6	53.87	18	35.87	V
2819.4	54.92	18	36.92	H
2896.7	54.08	18	36.08	V

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

	Result (dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Polarity
2674.8	41.93	17	24.93	V
2819.4	42.35	18	24.35	H
2896.7	42.13	18	24.13	V

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

Frequency (MHz)	Result (dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Polarity
3728.9	39.91	-6	45.91	V
4803.5	44.86	-4	48.86	V
7205.2	51.12	-2	53.12	V
9641.6	41.67	-1	42.67	H
13042.3	46.4	4	42.4	H
16387.4	46.87	9	37.87	V

RSE-1M-CH17-30M-1G

Frequency (MHz)	Result (dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Polarity
34.4	8.94	-15	23.94	H
180.3	33.72	-14	47.72	H
192.2	36.86	-13	49.86	H

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492.1	34.64	-6	40.64	H
703.4	23.39	-2	25.39	H
894.6	36.56	1	35.56	H

RSE-1M-CH17-1G-3G

Frequency (MHz)	Result (dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Polarity
2537.5	52.53	16	36.53	V
2614.4	53.07	17	36.07	H
2692.7	53.18	17	36.18	V
2783.9	54.65	18	36.65	V
2860.9	54.11	18	36.11	H
2955.1	54.71	19	35.71	H

RSE-1M-CH17-1G-3G (Average)

Frequency (MHz)	Result (dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Polarity
2783.9	42.48	18	24.48	V
2860.9	41.87	18	23.87	H
2955.1	43.06	19	24.06	H

RSE-1M-CH17-3G-18G

Frequency (MHz)	Result (dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Polarity
4879.4	44.46	-3	47.46	H
5835.8	40.07	-3	43.07	H
7319.2	48.25	-2	50.25	V
9110.7	42.76	-1	43.76	H
10609.0	42.61	1	41.61	V
16307.3	47.28	9	38.28	V

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

Frequency (MHz)	Result (dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Polarity
32.2	8.77	-16	24.77	V
204.2	30.57	-13	43.57	H
216.0	33.18	-12	45.18	H
228.0	32.55	-12	44.55	H
612.0	28.13	-2	30.13	H
696.9	27.42	-2	29.42	H

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

Frequency (MHz)	Result (dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Polarity
2549.7	53.08	16	37.08	H
2574.5	53.32	16	37.32	V
2622.4	53.42	17	36.42	H
2671.4	53.69	17	36.69	V
2745.5	54.51	18	36.51	V
2788.6	54.48	18	36.48	V

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

Frequency (MHz)	Result (dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Polarity
2745.5	42.38	18	24.38	V
2788.6	42.68	18	24.68	V

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

Frequency (MHz)	Result (dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Polarity
3497.7	39	-7	46	V
4959.4	46.61	-3	49.61	H
7439.2	50.75	-2	52.75	V
10039.3	42.31	0	42.31	V

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13676.6	45.51	4	41.51	V
17214.8	48.79	10	38.79	H

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

Frequency (MHz)	Result (dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Polarity
31.7	8.24	-16	24.24	V
34.5	11.21	-15	26.21	V
204.0	30.51	-13	43.51	H
216.0	33.14	-12	45.14	H
228.0	32.5	-12	44.5	H
696.1	27.01	-2	29.01	H

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

Frequency (MHz)	Result (dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Polarity
2139.7	49.59	12	37.59	V
2367.6	56.56	16	40.56	H
2566.3	53.55	16	37.55	H
2705.6	53.98	17	36.98	H
2805.9	54.43	18	36.43	H
2907.6	55.24	18	37.24	H

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

Frequency (MHz)	Result (dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Polarity
2367.6	40.06	16	24.06	H
2805.9	42.52	18	24.52	H
2907.6	42.52	18	24.52	H

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

Frequency (MHz)	Result (dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Polarity
3569.9	40.05	-6	46.05	H

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4806.9	45.12	-4	49.12	H
7212.0	50.45	-2	52.45	V
10237.6	43.43	1	42.43	H
13683.7	45.34	4	41.34	H
17558.7	47.99	10	37.99	H

RSE-2M-CH17-30M-1G

Frequency (MHz)	Result (dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Polarity
34.4	9.39	-15	24.39	H
180.0	34.95	-15	49.95	H
192.2	36.79	-13	49.79	H
480.0	33.65	-6	39.65	H
638.3	27.68	-3	30.68	H
894.0	31.02	1	30.02	H

RSE-2M-CH17-1G-3G

Frequency (MHz)	Result (dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Polarity
2577.7	53.05	16	37.05	V
2678.8	53.58	17	36.58	H
2760.8	55.24	18	37.24	H
2819.8	53.76	18	35.76	H
2911.4	55.06	18	37.06	H
2981.1	56	19	37	H

RSE-2M-CH17-1G-3G (Average)

Frequency (MHz)	Result (dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Polarity
2760.8	42.05	18	24.05	H
2911.4	42.52	18	24.52	H

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2981.1	43.46	19	24.46	H
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RSE-2M-CH17-3G-18G

Frequency (MHz)	Result (dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Polarity
5438.2	41.25	-3	44.25	H
7318.6	47.51	-2	49.51	V
9105.7	42.46	-1	43.46	V
11345.2	43.72	2	41.72	H
13766.4	45.12	4	41.12	H
16015.6	48.18	9	39.18	V

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

Frequency (MHz)	Result (dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Polarity
32.9	7.98	-16	23.98	V
204.0	30.75	-13	43.75	H
216.2	33.1	-12	45.1	H
228.0	32.56	-12	44.56	H
600.3	25.64	-2	27.64	H
683.8	28.98	-2	30.98	H

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

Frequency (MHz)	Result (dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Polarity
2557.4	52.83	16	36.83	H
2643.8	53.96	17	36.96	H
2708.6	53.98	17	36.98	H
2784.9	54.79	18	36.79	V
2865.3	54.68	18	36.68	V
2963.6	54.42	19	35.42	H

RSE-2M-CH39-1G-3G (Average)
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Frequency (MHz)	Result (dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Polarity
2784.9	42.64	18	24.64	V
2865.3	41.87	18	23.87	V
2963.6	43.17	19	24.17	H

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

Frequency (MHz)	Result (dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Polarity
3650.6	39.8	-6	45.8	V
5347.3	41.05	-3	44.05	V
7438.5	51.63	-2	53.63	V
10089.5	43.46	0	43.46	H
13585.0	44.82	4	40.82	V
17430.3	48.18	10	38.18	H

6.9. AC Powerline Conducted Emission

Specifications:	FCC 47 Part 15.207, RSS-Gen Issue 5
DUT Serial Number:	S3
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.f 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:

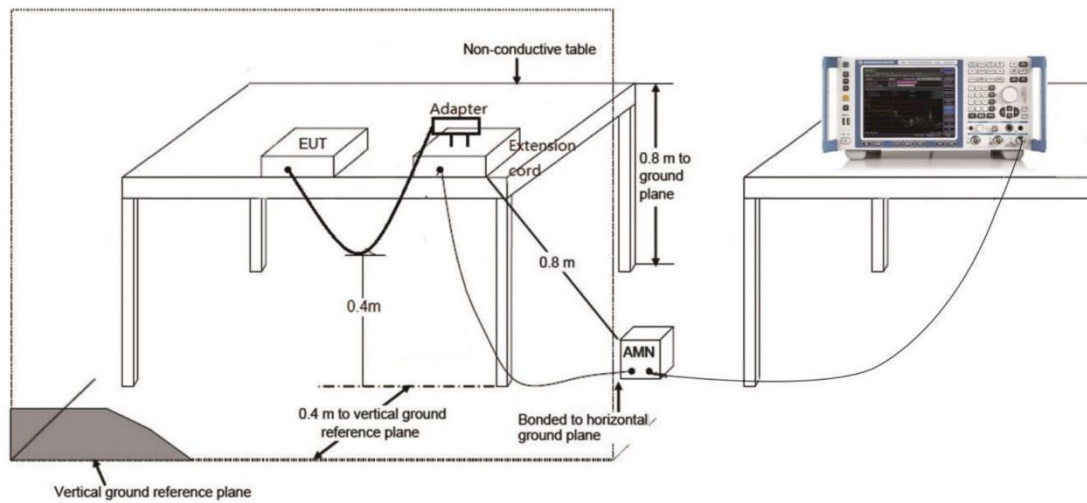
Measurement Uncertainty	1.97dB (k=2)
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Test Setup

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Test

Condition

Voltage (V)	Frequency (Hz)
120	60

Measurement Result and limit:

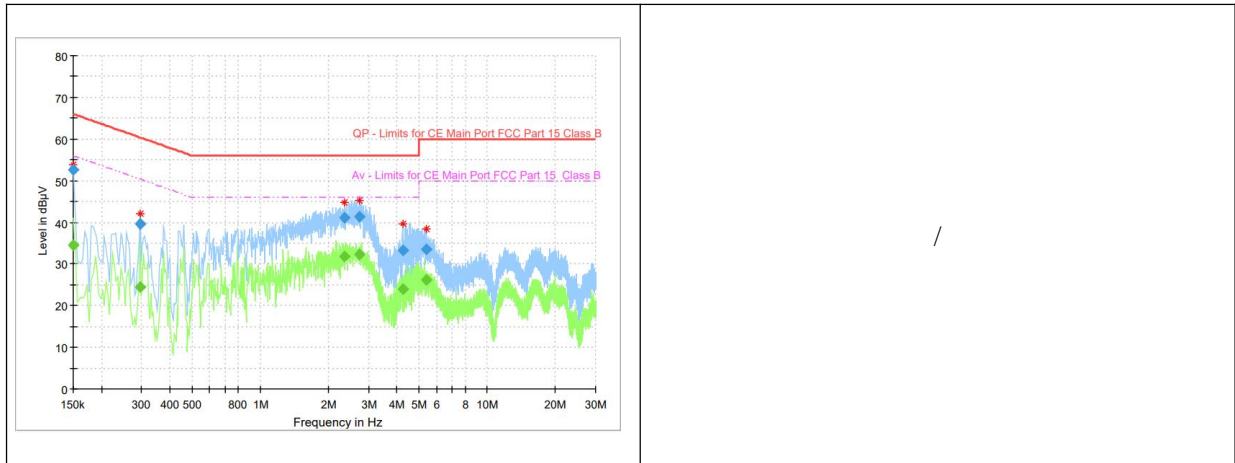
(Quasi-peak-average Limit)

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.

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Test graphs


Frequency (MHz)	QuasiPeak (dBμV)	Average (dμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.150000	52.56	---	66.00	13.44	15000.0	9.000	N	ON	9.6
0.150000	---	34.61	56.00	21.39	15000.0	9.000	N	ON	9.6
0.295519	39.63	---	60.37	20.74	15000.0	9.000	L1	ON	9.6
0.295519	---	24.38	50.37	25.99	15000.0	9.000	L1	ON	9.6
2.351438	---	31.79	46.00	14.21	15000.0	9.000	N	ON	9.7
2.351438	41.03	---	56.00	14.97	15000.0	9.000	N	ON	9.7
2.728294	---	32.26	46.00	13.74	15000.0	9.000	N	ON	9.7
2.728294	41.46	---	56.00	14.54	15000.0	9.000	N	ON	9.7
4.231988	---	23.89	46.00	22.11	15000.0	9.000	N	ON	9.7
4.231988	33.20	---	56.00	22.81	15000.0	9.000	N	ON	9.7
5.407331	---	26.19	50.00	23.81	15000.0	9.000	N	ON	9.8
5.407331	33.48	---	60.00	26.52	15000.0	9.000	N	ON	9.8

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ANNEX A EUT Photos

See the document "I23W00025-External Photos".

See the document "I23W00025-Internal Photos".

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ANNEX B Deviations from Prescribed Test Methods

No deviation from Prescribed Test Methods.

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

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