

FCC/IC - TEST REPORT

Report Number	: 708882069655-00	Date of Issue:	February 07, 2021
Model	: JCF35V-1, JCF35V-2, JCF35V-3, JCF35V-4		
Product Type	: Medical Foot Switch		
Applicant	: ZHEJIANG JIECANG LINEAR MOTION TECHNOLOGY CO., LTD		
Address	: No.19 XinTao Road, Provincial High Tech Park XinChang county,ZheJiang ProvinceP.O. Box 312500, XINCHANG COUNTY, 312500 China		
Manufacture	: ZHEJIANG JIECANG LINEAR MOTION TECHNOLOGY CO., LTD		
Address	: No.19 XinTao Road, Provincial High Tech Park XinChang county,ZheJiang ProvinceP.O. Box 312500, XINCHANG COUNTY, 312500 China		
Test Result	: ☒ Positive ☐ Negative		
Total pages including Appendices	: 23		

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2 Details about the Test Laboratory

Details about the Test Laboratory

Test Site 1

Company name: TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch
No.16 Lane, 1951 Du Hui Road,
Shanghai 201108,
P.R. China

Test Firm FCC
Registration
Number: 820234

Test Firm IC
Registration
Number: 25988

Telephone: +86 21 6141 0123
Fax: +86 21 6140 8600

3 Description of the Equipment Under Test

Product: Medical Foot Switch

Model no.: JCF35V-1, JCF35V-2, JCF35V-3, JCF35V-4

FCC ID: 2ANKDJCF35V

IC: 25785-JCF35V

Options and accessories: N/A

Rating: 2XBattery AAA 1.5V

RF Transmission Frequency: 2404MHz to 2479MHz

Number of operated channel: 5

Channel	Frequency (MHz)
1	2404
2	2419
3	2454
4	2469
5	2479

Modulation: GFSK

Antenna Type: PCB Antenna

Antenna Gain: 0dBi

Description of the EUT: The Equipment Under Test (EUT) is a RF Remote Control.

Test sample no.: SHA-510685-1

EUT was tested with channel 1, 3 and 5.

The sample's mentioned in this report is/are submitted/ supplied/ manufactured by client. The laboratory therefore assumes no responsibility for accuracy of information on the brand name, model number, origin of manufacture, consignment, antenna gain or any information supplied.

4 Summary of Test Standards

Test Standards	
FCC Part 15 Subpart C	PART 15 - RADIO FREQUENCY DEVICES Subpart C - Intentional Radiators
CANADA RSS-210 Issue 10	Licence-Exempt Radio Apparatus: Category I Equipment
CANADA RSS-Gen Issue 5	General Requirements for Compliance of Radio Apparatus

5 Summary of Test Results

Technical Requirements					
FCC Part 15 Subpart C, RSS-210, RSS-Gen					
Test Condition	Pages	Test Site	Test Result		
			Pass	Fail	N/A
15.207 Conducted emission AC power port RSS-Gen [8.8] Conducted emission AC power port	--	--	☐	☐	☒
§15.205(a), §15.209(a), §15.249(a), §15.249(c) RSS-210 B.10. (a) Field strength of emissions and Restricted bands	10	Site 1	☒	☐	☐
FCC §15.215(c) 20dB bandwidth RSS-Gen (6.7) 99% bandwidth	15	Site 1	☒	☐	☐
§15.249(d) Out of band emissions RSS-210 B.10. (b) Out of band emissions	18	Site 1	☒	☐	☐
RSS-Gen (6.8) Antenna requirement	See note 1		☒	☐	☐

Remark 1: N/A – Not Applicable. Conducted emission is not apply for battery operated device.

Note 1: §15.203 requirement: 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.

E.U.T Antenna: The EUT antenna is an integrated PCB antenna, the best-case gain of the antenna is 0 dBi.

The antenna of the **EUT** is permanently attached.

There are no provisions for connection to an external antenna.

Conclusion: The EUT unit complies with the requirement of §15.203 and RSS-Gen (6.8).

6 General Remarks

Remarks

This submittal(s) (test report) is intended for FCC ID: 2ANKDJCF35V, IC: 25785-JCF35V complies with Section 15.205, 15.209, 15.249 of the FCC Part 15, Subpart C Rules and RSS-210, RSS-Gen.

Declaration of EUT Family:

Note: There are series models mentioned in this report, and according to client's declaration, all the models have same electrical construction, so we chose the model: JCF35V-3 to perform all the tests.

SUMMARY:

All tests according to the regulations cited on page 5 were

■ - Performed

□ - **Not** Performed

The Equipment Under Test

■ - **Fulfills** the general approval requirements.

□ - **Does not** fulfill the general approval requirements.

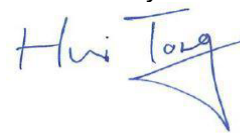
Sample Received Date: August 06, 2020

Testing Start Date: August 07, 2020

Testing End Date: August 27, 2020

- TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch -

Reviewed by:



Hui TONG
Review Engineer



Prepared by:



Jiayi XU
Project Engineer

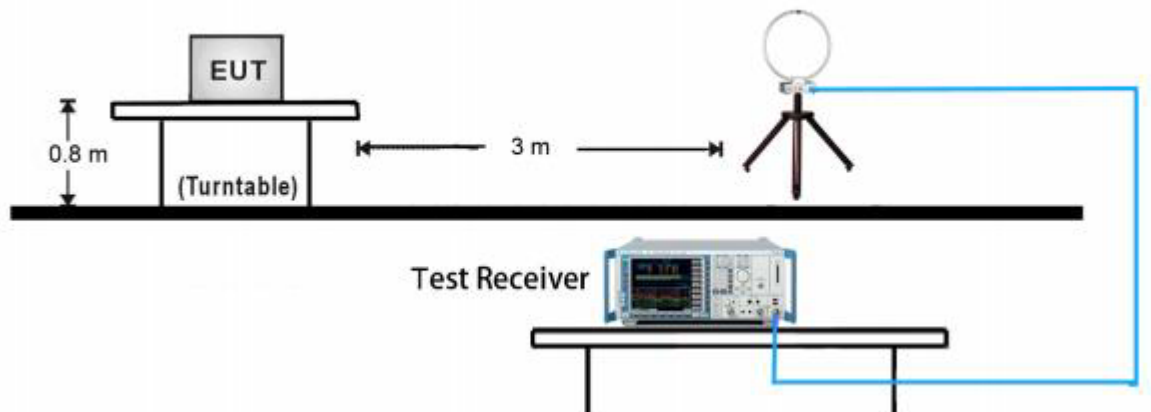
Tested by:



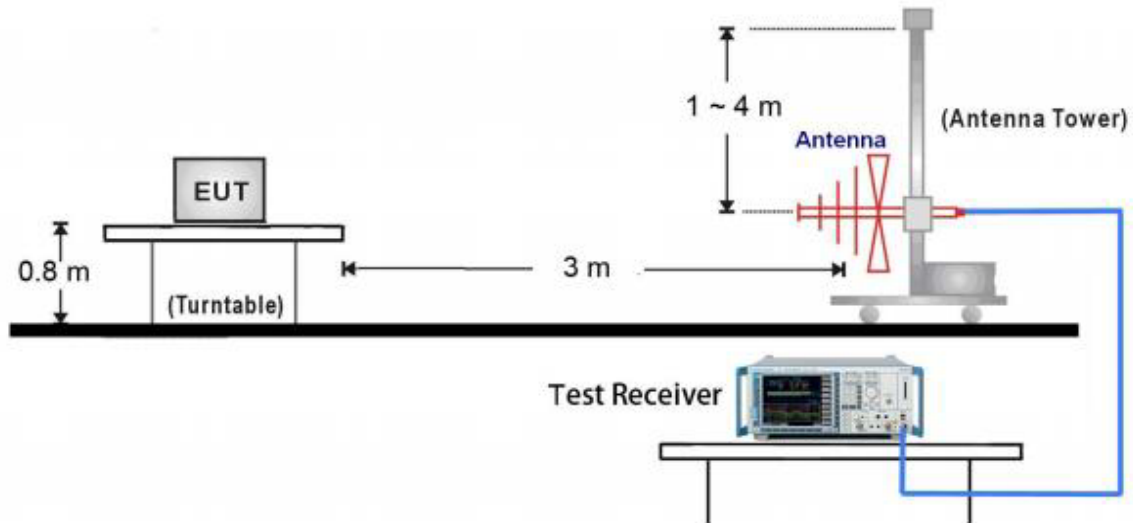
Wenqiang LU
Test Engineer

7 Test setups

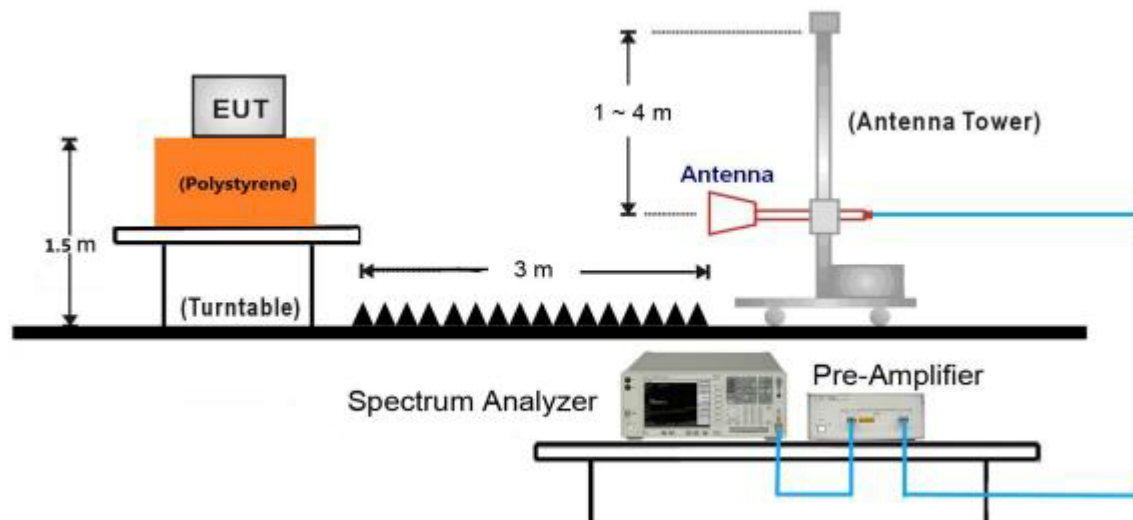
7.1 Radiated test setups 9kHz ~ 30MHz Test Setup:



30MHz ~ 1GHz Test Setup:



1GHz ~ 25GHz Test Setup:



8 Technical Requirement

8.1 Field strength of emissions and Restricted bands

Test Method

1. The EUT is placed on a turntable, which is 0.8m above ground plane.
2. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
3. Use the following spectrum analyzer settings:
Span = wide enough to fully capture the emission being measured ,RBW = 1 MHz for $f \geq 1\text{GHz}$, 100 kHz for $f < 1\text{GHz}$, VBW $\geq$ RBW, Sweep = auto, Detector function = peak, Trace = max hold
4. Follow the guidelines in ANSI C63.4-2014 with respect to maximizing the emission by rotating the EUT, adjusting the measurement antenna height and polarization, etc.
The peak reading of the emission, after being corrected by the antenna factor, cable loss, pre-amp gain, etc., is the peak field strength, submit this data. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
5. Set the VBW to 10 Hz, while maintaining all of the other instrument settings. This peak level, once corrected, must comply with the limit specified in Section 15.209. If the duty cycle per channel of the hopping signal is less than 100 ms, then the reading obtained with the 10 Hz VBW may be further adjusted by a "duty cycle correction factor", derived from $20\log(\text{duty cycle}/100\text{ ms})$, in an effort to demonstrate compliance with the 15.209 limit. Submit this data.

Limits

According to §15.249 (a) and RSS-210 B.10. (a), the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902–928 MHz	50	500
2400–2483.5 MHz	50	500
5725–5875 MHz	50	500
24.0–24.25 GHz	250	2500

According to §15.249 (c) and RSS-210 B.10. (a), Field strength limits are specified at a distance of 3 meters. According to §15.249 (d) and RSS-210 B.10. (b), Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

According to §15.205 and Unwanted emissions falling into restricted bands in §15.205 (a) Table 3 shall comply with the limits specified in §15.209.

According to RSS-Gen and Unwanted emissions falling into restricted bands in RSS-Gen 7.3 Table 3 shall comply with the limits specified in RSS-Gen.

30-1000MHz Radiated Emission

EUT Information

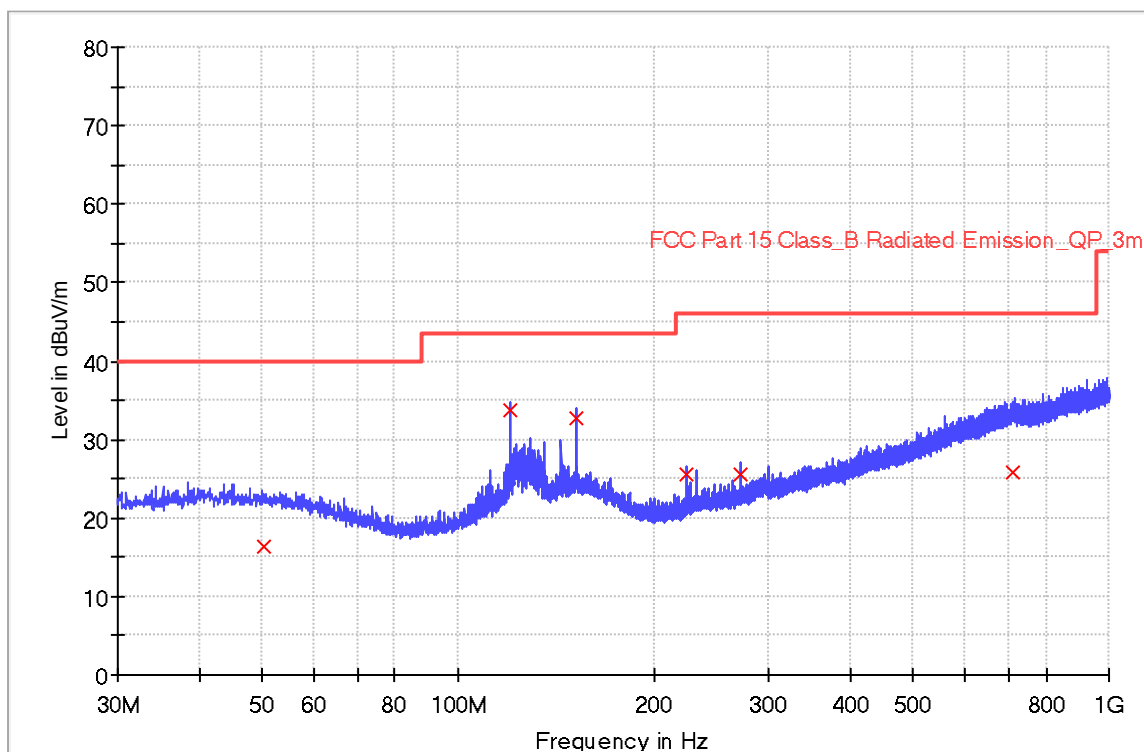
EUT Name: Medical Foot Switch
 Model: JCF35V-3
 Client: ZHEJIANG JIECANG LINEAR MOTION TECHNOLOGY CO., LTD
 Op Cond: Power on and Tx, DC 3V, 21.1, H47.4%, P103.1kPa
 Operator: Cheng Huali
 Test Spec: FCC Part 15 Class B
 Comment: Horizontal
 Sample No: SHA-510685-1

Sweep Setup: RE_VULB9168_pre_Cont_30-1000 [EMI radiated]

Hardware Setup: RE_VULB9168
 Receiver: [ESR 3]
 Level Unit: dBuV/m

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
30 MHz - 1 GHz	48.5 kHz	PK+	120 kHz	0.005 s	20 dB

RE_VULB9168_pre_Cont_30-1000



Limit and Margin

Frequency (MHz)	QuasiPeak (dBuV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBuV/m)
50.320000	16.4	1000.0	120.000	100.3	H	269.0	14.3	23.6	40.0
119.960000	33.7	1000.0	120.000	149.7	H	0.0	13.5	9.8	43.5
151.920000	32.6	1000.0	120.000	100.3	H	1.0	15.7	10.9	43.5
224.000000	25.5	1000.0	120.000	100.3	H	77.0	12.7	20.5	46.0
272.080000	25.5	1000.0	120.000	100.3	H	150.0	14.1	20.5	46.0
713.560000	25.8	1000.0	120.000	100.3	H	208.0	23.4	20.2	46.0

30-1000MHz Radiated Emission

EUT Information

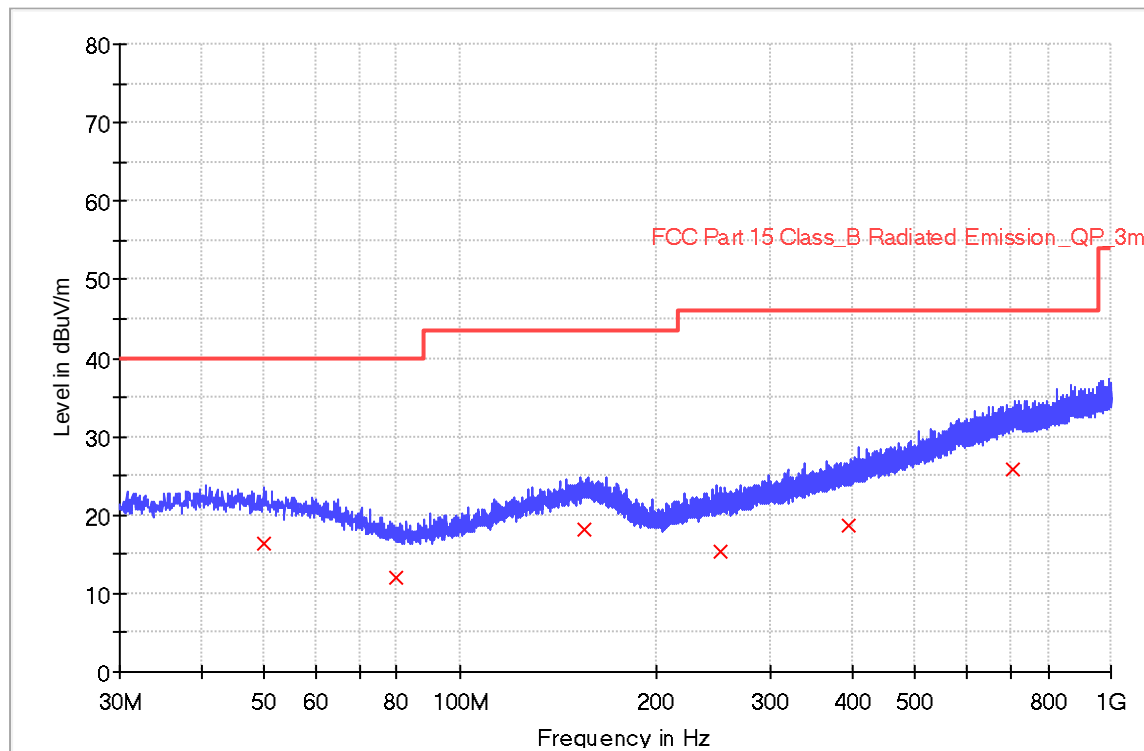
EUT Name: Medical Foot Switch
 Model: JCF35V-3
 Client: ZHEJIANG JIECANG LINEAR MOTION TECHNOLOGY CO., LTD
 Op Cond: Power on and Tx, DC 3V, 21.1, H47.4%, P103.1kPa
 Operator: Cheng huali
 Test Spec: FCC Part 15 Class B
 Comment: Vertical
 Sample No: SHA-510685-1

Sweep Setup: RE_VULB9168_pre_Cont_30-1000 [EMI radiated]

Hardware Setup: RE_VULB9168
 Receiver: [ESR 3]
 Level Unit: dBuV/m

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamplifier
30 MHz - 1 GHz	48.5 kHz	PK+	120 kHz	0.005 s	20 dB

RE_VULB9168_pre_Cont_30-1000



Limit and Margin

Frequency (MHz)	QuasiPeak (dBuV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBuV/m)
50.000000	16.3	1000.0	120.000	100.0	V	216.0	14.3	23.7	40.0
79.520000	12.0	1000.0	120.000	100.0	V	40.0	10.4	28.0	40.0
155.520000	18.3	1000.0	120.000	100.0	V	269.0	15.7	25.2	43.5
250.440000	15.5	1000.0	120.000	100.0	V	78.0	13.7	30.5	46.0
396.560000	18.8	1000.0	120.000	100.0	V	1.0	17.3	27.3	46.0
709.200000	25.7	1000.0	120.000	100.0	V	326.0	23.4	20.3	46.0

Field strength of emissions and Restricted bands

Tx at channel 1: 2404MHz

Fundamental Frequency (MHz)	Polarisation (Vertical/ Horizontal)	Field Strength	Margin	Limit	Type
		dB μ V/m	(dB)	(dB μ V/m)	AV/PK
2404.04	H	82.24	31.76	114.0	PK
1727.6	H	46.98	27.02	74.0	PK
1938.4	H	42.77	31.23	74.0	PK
2749.3	H	45.54	28.46	74.0	PK
4808.5	H	43.65	30.35	74.0	PK
2403.78	V	73.67	40.33	114.0	PK
1766.7	V	46.01	27.99	74.0	PK
1937.83	V	46.98	27.02	74.0	PK
4808.2	V	42.21	31.79	74.0	PK

Tx at channel 3: 2454MHz

Fundamental Frequency (MHz)	Polarisation (Vertical/ Horizontal)	Field Strength	Margin	Limit	Type
		dB μ V/m	(dB)	(dB μ V/m)	AV/PK
2454.33	H	80.23	33.77	114.0	PK
1914.03	H	45.85	28.15	74.0	PK
2806.53	H	43.95	30.05	74.0	PK
4907.73	H	47.88	26.12	74.0	PK
2454.28	V	73.30	40.7	114.0	PK
1921.4	V	42.72	31.28	74.0	PK
4908.86	V	44.56	29.44	74.0	PK

Tx at channel 5: 2479MHz

Fundamental Frequency (MHz)	Polarisation (Vertical/ Horizontal)	Field Strength	Margin	Limit	Type
		dBµV/m	(dB)	(dBµV/m)	AV/PK
2478.92	H	76.19	37.81	114.0	PK
1417.63	H	37.21	36.79	74.0	PK
2835.43	H	45.91	28.09	74.0	PK
4958.16	H	50.22	23.78	74.0	PK
2479.03	V	68.01	45.99	114.0	PK
4958.16	V	44.85	29.15	74.0	PK

According to C63.10, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement, so AV emission value did not show in below table if the peak value complies with average limit.

The only worse case test result is listed in the report.

Remark:

Above 1GHz: Corrector factor = Antenna Factor + Cable Loss- Pre-amplifier

Below 1GHz: Corrector factor = Antenna Factor + Cable Loss

Emission Level = Reading level + Correction Factor

(The Reading Level is recorded by software which is not shown in the sheet)

Note 1: The test trace is same as the ambient noise and the amplitude of the emissions are attenuated more than 20dB below the permissible (the test frequency range: 9kHz ~ 30MHz, 18GHz ~ 25GHz), therefore no data appear in the report.

8.2 20dB & 99% Bandwidth

Test Method

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level and 99% Occupied Bandwidth. Record the frequency difference as the emission bandwidth.

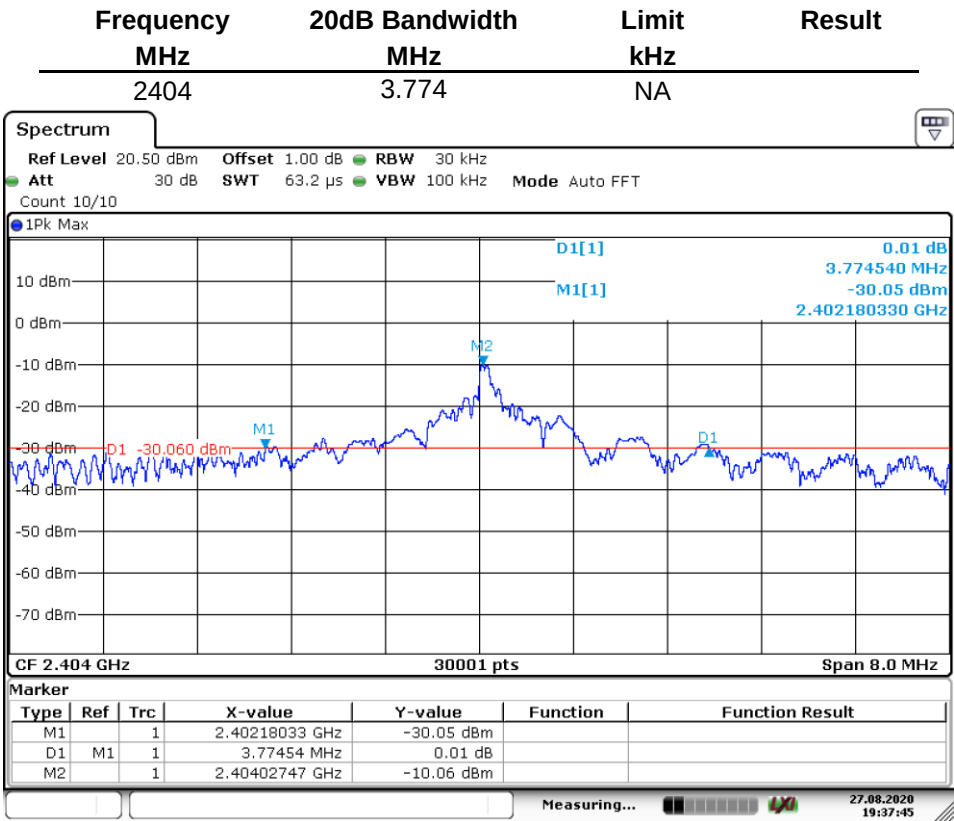
Limits:

According to 15.215 (c) Intentional radiators operating under the alternative provisions to the general emission limits, as contained in § 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

Limits:

According to RSS-Gen 6.7: The occupied bandwidth or the "99% emission bandwidth" is defined as the frequency range between two points, one above and the other below the carrier frequency, within which 99% of the total transmitted power of the fundamental transmitted emission is contained. The occupied bandwidth shall be reported for all equipment in addition to the specified bandwidth required in the applicable RSSs.

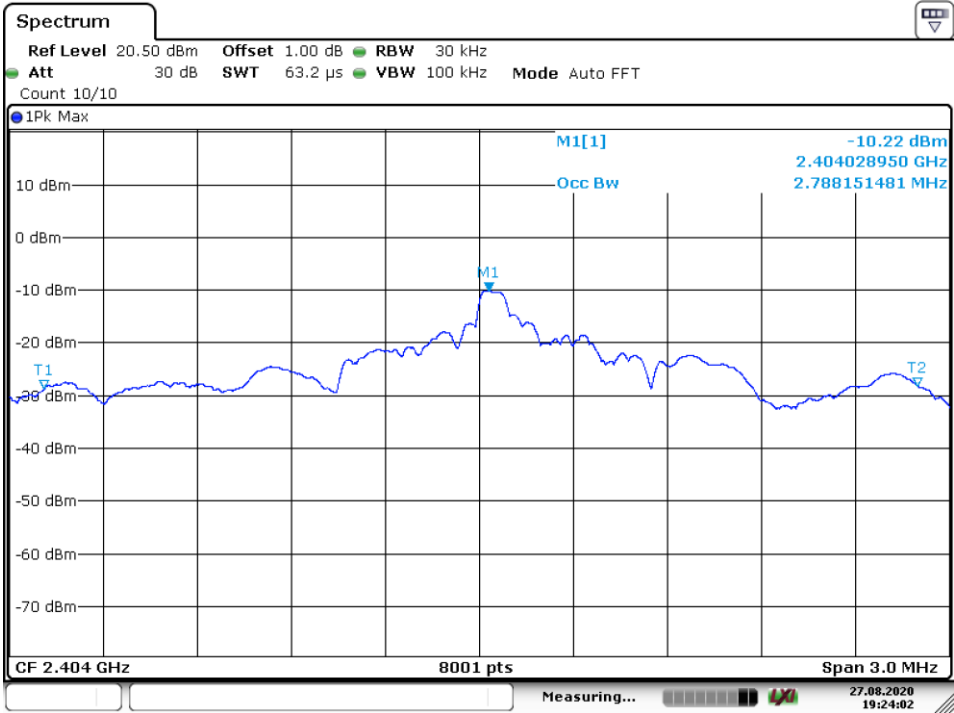
20dB Bandwidth worst result



Date: 27.AUG.2020 19:37:45

99% Bandwidth worst result

Frequency	99% Bandwidth	Limit	Result
MHz	MHz	kHz	
2462	2.788	NA	PASS



Date: 27.AUG.2020 19:24:02

8.3 Band edge testing

Test Method

- 1 Use the following spectrum analyzer settings:
Span = wide enough to capture the peak level of the in-band emission and all spurious
RBW = 100 kHz, VBW $\geq$ RBW, Sweep = auto, Detector function = peak, Trace = max hold
- 2 Allow the trace to stabilize, use the peak and delta measurement to record the result.
- 3 The level displayed must comply with the limit specified in this Section. .
- 4 Repeat the test at the hopping off and hopping on mode, submit all the plots.

Limit:

According to §15.249(d), Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

According to RSS-210 B.10(b) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in RSS-GEN, whichever is the lesser attenuation.

Band edge testing

Tx at channel 1: 2404MHz

Fundamental Frequency (MHz)	Polarisation (Vertical/ Horizontal)	Field Strength	Margin	Limit	Type
		dBµV/m	(dB)	(dBµV/m)	AV/PK
2389.79	H	58.29	15.71	74.0	PK
2389.79	H	30.3	23.7	54.0	AV
2389.97	V	49.01	24.99	74.0	PK

Tx at channel 5: 2479MHz

Fundamental Frequency (MHz)	Polarisation (Vertical/ Horizontal)	Field Strength	Margin	Limit	Type
		dBµV/m	(dB)	(dBµV/m)	AV/PK
2485.12	H	67.41	6.59	74.0	PK
2485.12	H	41.3	12.7	54.0	AV
2484.4	V	57.88	16.12	74.0	PK
2484.4	V	36.7	17.3	54.0	AV

Remark:

- (1) Above 1GHz: Corrector factor = Antenna Factor + Cable Loss- Pre-amplifier
 Emission Level = Reading level + Correction Factor
 (The Reading Level is recorded by software which is not shown in the sheet)

9 Test equipment list

List of Test Instruments

Test Site1

	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL. DATE	CAL. DUE DATE
RE	EMI Test Receiver	Rohde & Schwarz	ESR3	101906	2020-8-4	2021-8-3
	Signal Analyzer	Rohde & Schwarz	FSV40	101091	2020-8-4	2021-8-3
	Trilog Super Broadband Test Antenna	Schwarzbeck	VULB 9168	961	2019-3-16	2022-3-15
	Horn Antenna	Rohde & Schwarz	HF907	102393	2018-6-11	2021-4-1
	Pre-amplifier	Rohde & Schwarz	SCU-18D	19006451	2020-8-4	2021-8-3
	Loop antenna	Rohde & Schwarz	HFH2-Z2	100443	2020-6-28	2021-6-27
	DOUBLE-RIDGED WAVEGUIDE HORN WITH PRE-AMPLIFIER (18 GHZ - 40 GHZ)	ETS-Lindgren	3116C-PA	002222727	2018-1-29	2021-1-28
	3m Semi-anechoic chamber	TDK	9X6X6	----	2018-5-11	2021-5-10
Measurement Software Information						
Test Item	Software	Manufacturer	Version			
RE	EMC 32	Rohde & Schwarz	V9.15.00			

10 System Measurement Uncertainty

For a 95% confidence level, the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 were:

Items	Extended Uncertainty
Conducted Disturbance at Mains Terminals	150kHz to 30MHz, LISN, $\pm 3.16\text{dB}$
Radiated Disturbance	30MHz to 1GHz, $\pm 5.03\text{dB}$ (Horizontal) $\pm 5.12\text{dB}$ (Vertical) 1GHz to 18GHz, $\pm 5.49\text{dB}$ 18GHz to 40GHz, $\pm 5.63\text{dB}$
Carrier power conducted measurement	50MHz~18GHz, $\pm 1.238\text{dB}$
Spurious Emission Conducted Measurement	9kHz ~40GHz, $\pm 1.224\text{dB}$

11 Photographs of Test Set-ups

Refer to the < Test Setup photos >.

12 Photographs of EUT

Refer to the < External Photos > & < Internal Photos >.

THE END