

FCC - TEST REPORT

Report Number : **68.950.17.357.01** Date of Issue: June 19, 2017

Model : SP8001, SP8000, SWK 360 A1

Product Type : 360 wifi panoramic remote control

Applicant : Lidl US Trading, LLC

Address : 3500 S. Clark Street, Arlington Virginia United States 22202

Manufacture : DONGGUAN AOMEIJIA ELECTRONIC CO., LTD

Address : Lefushan industrial zone, Yonganpu Village, Fenggang town,
: Dongguan, Guangdong, China.

Test Result : **Positive** **Negative**

Total pages including
Appendices : 21

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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. Shenzhen Branch
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FCC Registration Number: 502708

3 Description of the Equipment Under Test

Product:	360 wifi panoramic remote control
Model no.:	SP8001, SP8000, SWK 360 A1 Three models are same except for the Model name difference. So the tests were applied on SWK 360 A1, other models are deemed to fulfil the EMC test without further testing.
FCC ID:	2AJ9O-SWK360R
Brand Name:	NIL
Options and accessories:	NIL
Rating:	DC 3V(Supply by CR 2032 Battery)
RF Transmission Frequency:	2450MHz
Modulation:	FSK
Antenna Type:	Intergral Antenna
Antenna Gain:	1.2dBm
Description of the EUT:	The Equipment Under Test (EUT) is a 360 wifi panoramic camera which supports 2.4G functions.



4 Summary of Test Standards

Test Standards	
FCC Part 15 Subpart C 10-1-2016 Edition	PART 15 - RADIO FREQUENCY DEVICES Subpart C - Intentional Radiators

5 Summary of Test Results

Technical Requirements					
FCC Part 15 Subpart C					
Test Condition	Pages	Test Site	Test Result		
			Pass	Fail	N/A
15.207 Conducted emission AC power port	---	---	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
§15.205(a), §15.209(a), §15.249(a), §15.249(c) Field strength of emissions and Restricted bands	9	PASS	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
FCC §15.215(c) 20dB bandwidth	16	PASS	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
§15.249(d) Out of band emissions	18	PASS	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

6 General Remarks

Remarks

This submittal(s) (test report) is intended for FCC ID: 2AJ9O-SWK360R complies with Section 15.205, 15.209, 15.249 of the FCC Part 15, Subpart C Rules.

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: May 03, 2017

Testing Start Date: May 03, 2017

Testing End Date: June 02, 2017

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

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Tested by:

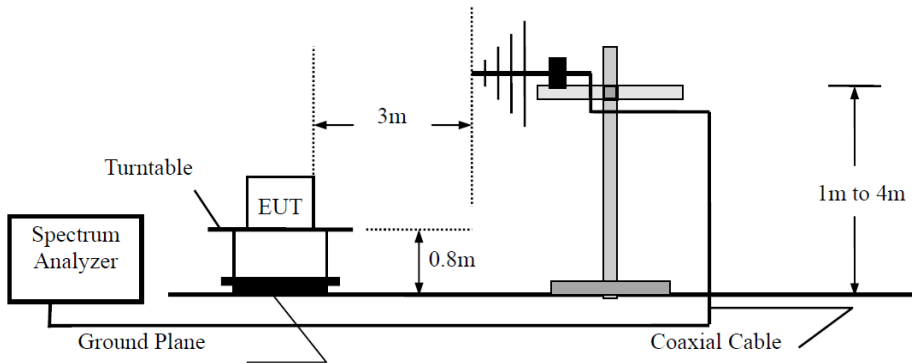


Endy Xie
EMC Test Engineer

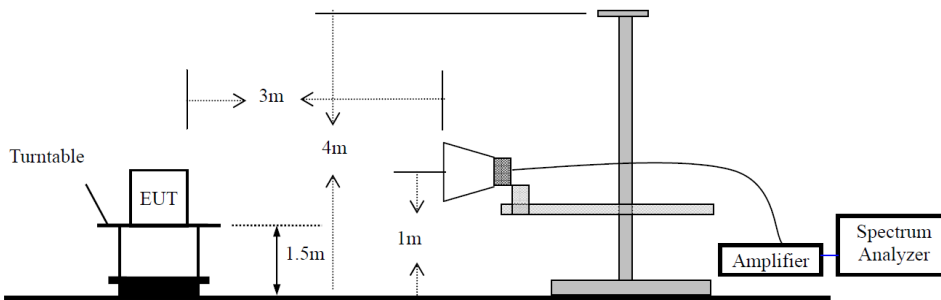
7 Test setups

7.1 Radiated test setups

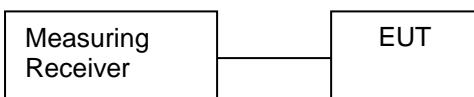
Below 1GHz



Above 1GHz



7.2 Conducted RF test setups



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 C63.4-1992 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), the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

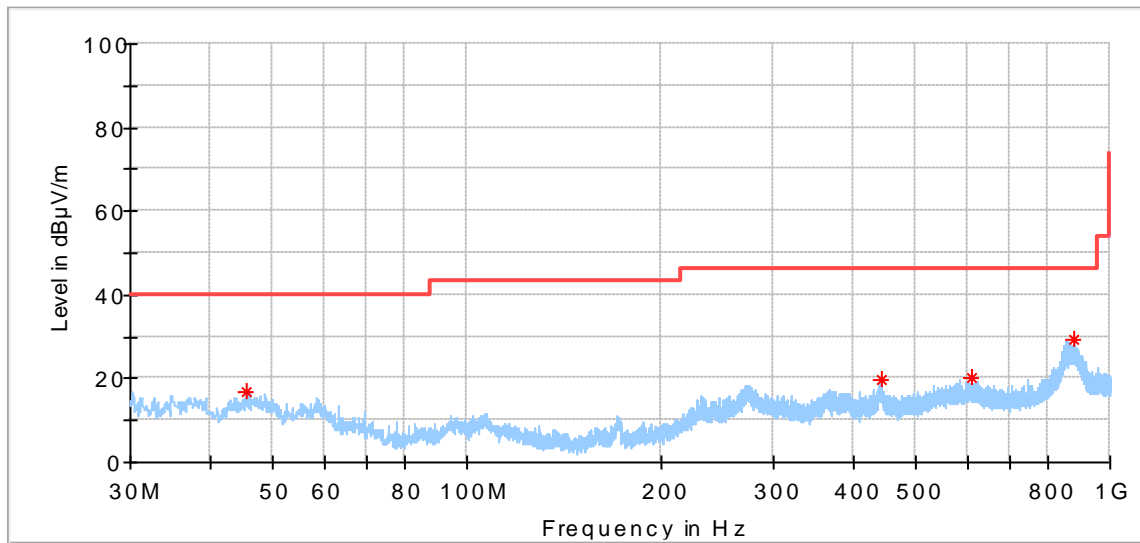
Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902–928 MHz	50	500
2400–2483.5 MHz	50	500
5725–5875 MHz	50	500
24.0–24.25 GHz	250	2500

According to §15.249 (c), Field strength limits are specified at a distance of 3 meters.
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 §15.205 and Unwanted emissions falling into restricted bands in §15.205 (a) Table 3 shall comply with the limits specified in §15.209.

Field strength of emissions and Restricted bands

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.

EUT: 360 wifi panoramic remote control
 M/N: SWK 360 A1
 Operating Condition: TX
 Ant. Polarity: Horizontal
 Comment: 30-1000MHz



Critical Freqs

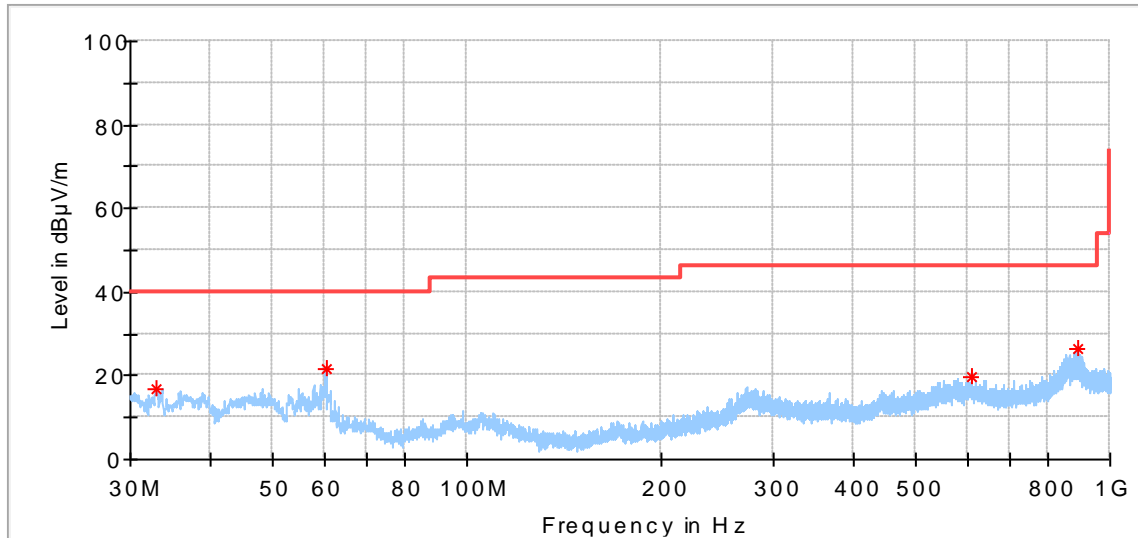
Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
45.466111	16.97	40.00	23.03	---	---	154.0	H	228.0	-25.2
440.040556	19.57	46.00	26.43	---	---	154.0	H	341.0	-23.0
608.120000	20.39	46.00	25.61	---	---	154.0	H	349.0	-19.3
878.049444	29.40	46.00	16.60	---	---	154.0	H	245.0	-16.0

Final Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
---	---	---	---	---	---	---		---	---

Field strength of emissions and Restricted bands

EUT: 360 wifi panoramic remote control
 M/N: SWK 360 A1
 Operating Condition: TX
 Ant. Polarity: Vertical
 Comment: 30-1000MHz



Critical_Freqs

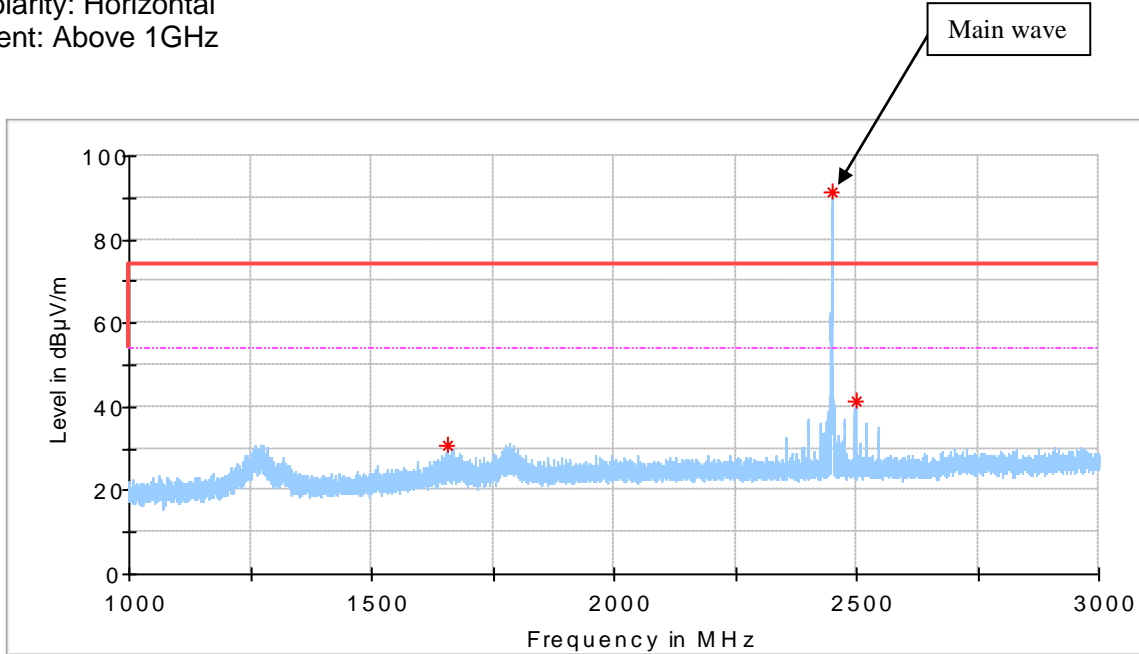
Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
32.963889	16.96	40.00	23.04	---	---	154.0	V	329.0	-26.5
60.555000	21.55	40.00	18.45	---	---	154.0	V	254.0	-28.0
610.760556	19.56	46.00	26.44	---	---	154.0	V	18.0	-19.2
891.467778	26.52	46.00	19.48	---	---	154.0	V	65.0	-15.7

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
---	---	---	---	---	---	---		---	---

Field strength of emissions and Restricted bands

EUT: 360 wifi panoramic remote control
 M/N: SKW 360 A1
 Operating Condition: TX
 Ant. Polarity: Horizontal
 Comment: Above 1GHz

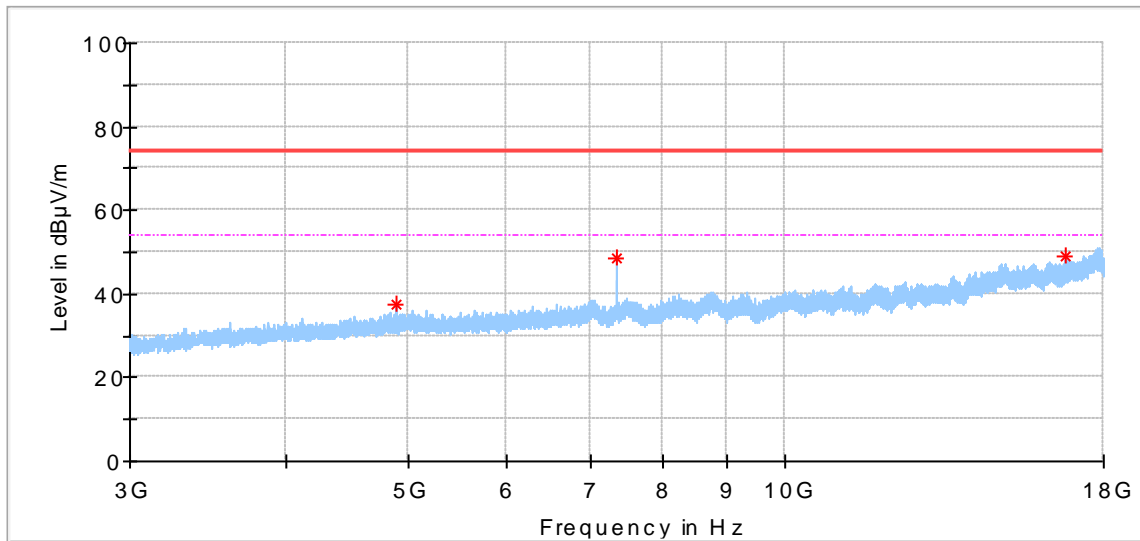


Critical Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
1655.875000	30.92	74.00	43.08	---	---	154.0	H	300.0	-9.8
2449.937500	91.51	74.00	-17.51	---	---	154.0	H	228.0	-6.3
2498.000000	41.52	74.00	32.48	---	---	154.0	H	263.0	-6.0

Final Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
---	---	---	---	---	---	---	---	---	---



Critical_Freqs

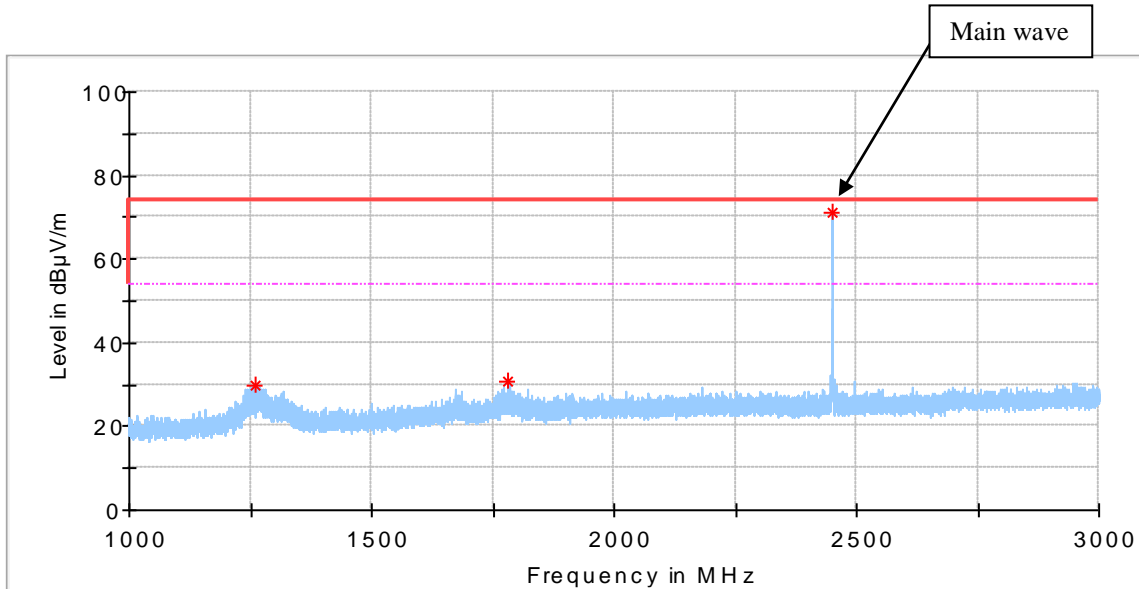
Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
4900.312500	37.48	74.00	36.52	---	---	154.0	H	153.0	1.8
7350.000000	48.49	74.00	25.51	---	---	154.0	H	188.0	5.9
16765.312500	49.21	74.00	24.79	---	---	154.0	H	275.0	19.9

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
---	---	---	---	---	---	---	---	---	---

Field strength of emissions and Restricted bands

EUT: 360 wifi panoramic remote control
 M/N: SKW 360 A1
 Operating Condition: TX
 Ant. Polarity: Vertical
 Comment: Above 1GHz

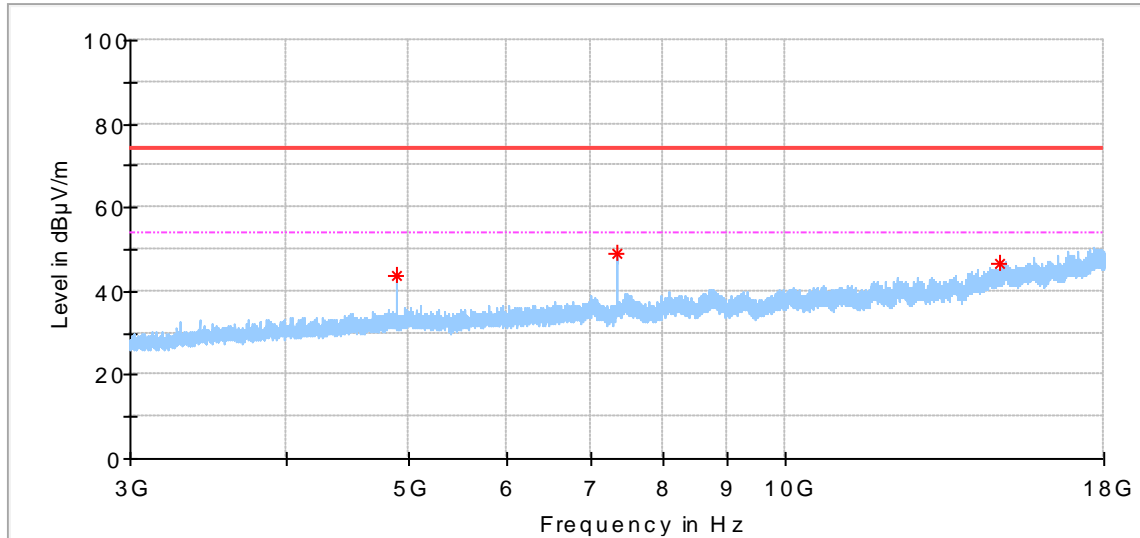


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
1259.937500	30.04	74.00	43.96	---	---	154.0	V	111.0	-12.1
1780.562500	30.87	74.00	43.13	---	---	154.0	V	244.0	-9.0
2449.937500	70.94	74.00	3.06	---	---	154.0	V	161.0	-6.3

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
---	---	---	---	---	---	---		---	---



Critical Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
4900.312500	43.74	74.00	30.26	---	---	154.0	V	299.0	1.8
7350.937500	48.80	74.00	25.20	---	---	154.0	V	281.0	5.9
14842.968750	46.86	74.00	27.14	---	---	154.0	V	46.0	17.8

Final Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
---	---	---	---	---	---	---		---	---

8.2 20dB 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. 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.

20dB Bandwidth

Frequency	20dB Bandwidth	Limit	Result
2450MHz	2923kHz	500kHz	Pass



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8.3 Band edge testing

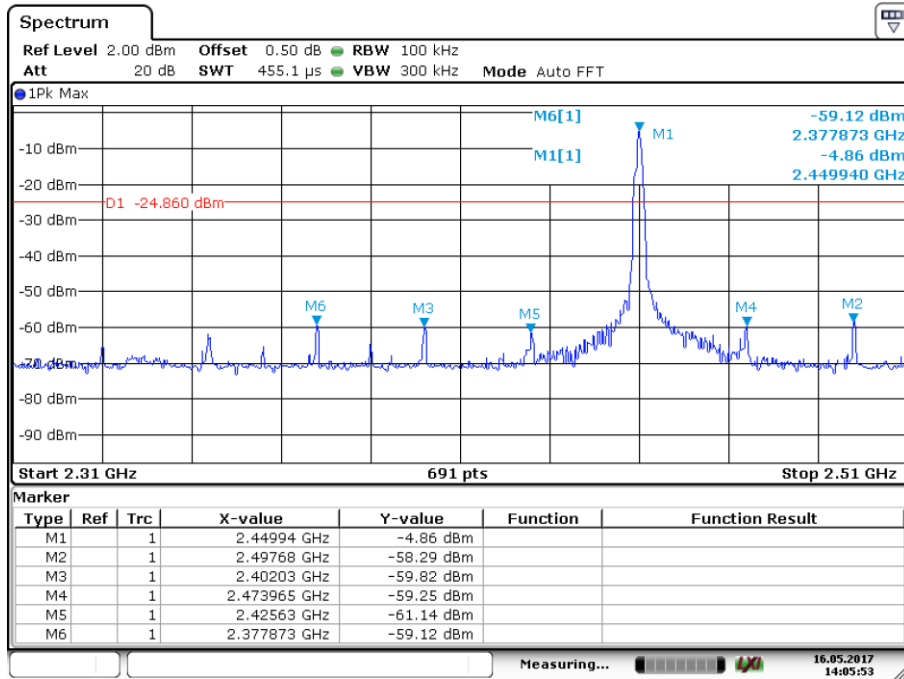
Test Method

- 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.

Band edge testing



Date: 16.MAY.2017 14:05:53

9 Test equipment list

List of Test Instruments

	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL. DUE DATE
C	Signal Generator	Rohde & Schwarz	SMB100A	108272	2017-7-15
	Signal Analyzer	Rohde & Schwarz	FSV40	101030	2017-7-15
	Vector Signal Generator	Rohde & Schwarz	SMU 200A	105324	2017-7-15
	RF Switch Module	Rohde & Schwarz	OSP120/OS P-B157	101226/10085 1	2017-7-15
RE	EMI Test Receiver	Rohde & Schwarz	ESR 26	101269	2017-7-15
	Trilog Super Broadband Test Antenna	Schwarzbeck	VULB 9163	707	2017-8-3
	Horn Antenna	Rohde & Schwarz	HF907	102294	2017-7-15
	Pre-amplifier	Rohde & Schwarz	SCU 18	102230	2017-7-15
	3m Semi-anechoic chamber	TDK	9X6X6	----	2019-5-29

C - Conducted RF tests

- Conducted peak output power
- 6dB bandwidth and 99% Occupied Bandwidth
- Power spectral density*
- Spurious RF conducted emissions
- Band edge

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:

System Measurement Uncertainty	
Test Items	Extended Uncertainty
Radiated Spurious Emission 25MHz-3000MHz	Horizontal: 4.98dB; Vertical: 5.06dB;
Radiated Spurious Emission 3000MHz-18000MHz	Horizontal: 4.95dB; Vertical: 4.94dB;
Radiated Spurious Emission 18000MHz-40000MHz	Horizontal: 5.14dB; Vertical: 5.12dB;
Conducted RF test with TS 8997	Power level test involved: 2.06dB Frequency test involved: 1.16×10^{-7}