



FCC/IC - TEST REPORT

Report Number : **68.940.19.0030.01** Date of Issue: August 02, 2019

Model : **LM57176**

Product Type : Microwave sensor for Ceiling light

Applicant : Winplus Co., Ltd.

Address : Suites 6-11, 7th Floor, Corporation Park, 11 On Lai Street, Shatin,
Hong Kong

Manufacture : Winplus Co., Ltd.

Address : Suites 6-11, 7th Floor, Corporation Park, 11 On Lai Street, Shatin,
Hong Kong

Test Result : Positive Negative

Total pages including Appendices : 27

TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch is a subcontractor to TÜV SÜD Product Service GmbH according to the principles outlined in ISO 17025.

TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch reports apply only to the specific samples tested under stated test conditions. Construction of the actual test samples has been documented. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. The manufacturer/importer is responsible to the Competent Authorities in Europe for any modifications made to the production units which result in non-compliance to the relevant regulations. TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch shall have no liability for any deductions, inferences or generalizations drawn by the client or others from TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch issued reports.

This report is the confidential property of the client. As a mutual protection to our clients, the public and ourselves, extracts from the test report shall not be reproduced except in full without our written approval



1 Table of Contents

1 Table of Contents.....	2
2 Details about the Test Laboratory.....	3
3 Description of the Equipment Under Test.....	4
4 Summary of Test Standards.....	5
5 Summary of Test Results.....	6
6 General Remarks.....	7
7 Test setups.....	8
8 Technical Requirement.....	9
8.1 Conducted Emission.....	9
8.2 Field strength of emissions and Restricted bands.....	12
Field strength of emissions and Restricted bands.....	13
8.3 Out of Band Emissions.....	17
8.4 20dB Bandwidth & 99% Occupied Bandwidth.....	22
9 Test equipment lists.....	26
10 System Measurement Uncertainty.....	27



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
Building 12&13, Ziheng Wisdomland Business Park,
Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052,
P. R. China

FCC Registration Number: 514049

ISED#: 10320A

CAB identifier: CN0077

Telephone: 86 755 8828 6998
Fax: 86 755 8828 5299

3 Description of the Equipment Under Test

Description of the Equipment Under Test

Product/PMN:	Microwave sensor for Ceiling light
Model no./HVIN:	LM57176
HMN:	LED Ceiling light with ambiance glow
FCC ID:	WUI-LM57176
IC:	7297A-LM57176
Options and accessories:	NIL
Ratings:	8-12VDC (Supplied by LED driver)
RF Transmission Frequency:	5734MHz - 5858MHz
Modulation:	Unmodulated
Antenna Type:	PCB
Antenna Gain:	1.62dBi
Description of the EUT:	The product is a Microwave sensor for Ceiling light that operated at 5.8GHz, The TX and RX range is 5734MHz - 5858MHz

Auxiliary Equipment Used during Test:

DESCRIPTION	MANUFACTURER	RATINGS	MODEL NO.(SHIELD)
LED Ceiling Light	WINPLUS	Input: 120VAC/60Hz, 24W Max	LM57176

4 Summary of Test Standards

Test Standards	
FCC Part 15 Subpart C 10-1-2017 Edition	PART 15 - RADIO FREQUENCY DEVICES Subpart C - Intentional Radiators
RSS-Gen Issue 5, Amendment 1, March 2019	General Requirements and Information for the Certification of Radio Apparatus
RSS-210 Issue 9 August 2016	RSS-210 — Licence-exempt Radio Apparatus (All Frequency Bands): Category I Equipment

All the test methods were according to ANSI C63.10-2013.

5 Summary of Test Results

Technical Requirements					
FCC Part 15 Subpart C 15.249, RSS-Gen, RSS-210					
Test Condition	Pages	Test Site	Test Result		
			Pass	Fail	N/A
15.207 & RSS-Gen A8.8 Conducted emission AC power port	9	Site 1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
§15.205(a), §15.209(a), §15.249(a), §15.249(c) & RSS-210 B.10, RSS-GEN 6.13/8.9/8.10 Field strength of emissions and Restricted bands	12	Site 1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
§15.249(d), RSS-210 B.10 Out of band emissions	21	Site 1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
FCC §15.215(c) 20dB bandwidth & RSS-Gen 6.7 99% Occupied Bandwidth	26	Site 1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
§15.203, RSS-GEN 6.8 Antenna requirement	See note 1		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Remark 1: N/A- Not Applicable;

Note 1: The EUT used an integral PCB antenna, which gain is 1.62dBi. According to §15.203, it is considered sufficiently to comply with the provisions of this section.

Note 2: The radio module do not has shielded cover, so it was tested with a host for this modular approve application, the host information as below :

Company name: Winplus Co., Ltd.

Product/PMN: LED Ceiling light with ambiance glow

Model no./HVIN: LM57176

6 General Remarks

Remarks

This submittal(s) (test report) is intended for FCC ID: WUI-LM57176 and IC: 7297A-LM57176 complies with Section 15.207, 15.205, 15.209, 15.249 of the FCC Part 15, Subpart C Rules; RSS-Gen Issue 5 and RSS-210 issue 9.

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: July 10, 2019

Testing Start Date: July 10, 2019

Testing End Date: July 19, 2019

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

Reviewed by:

Prepared by:

Tested by:



Laurent Yuan
EMC Project Manager



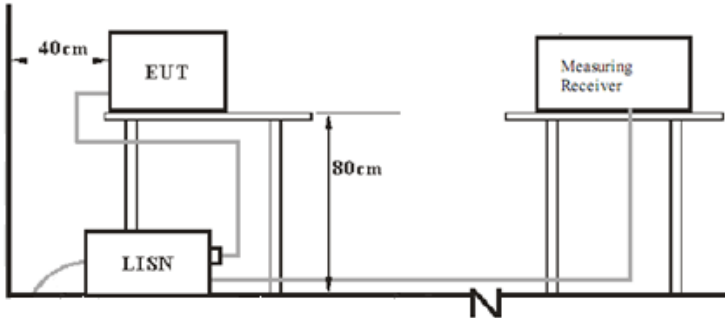
Henry Chen
EMC Project Engineer



Louise Liu
EMC Test Engineer

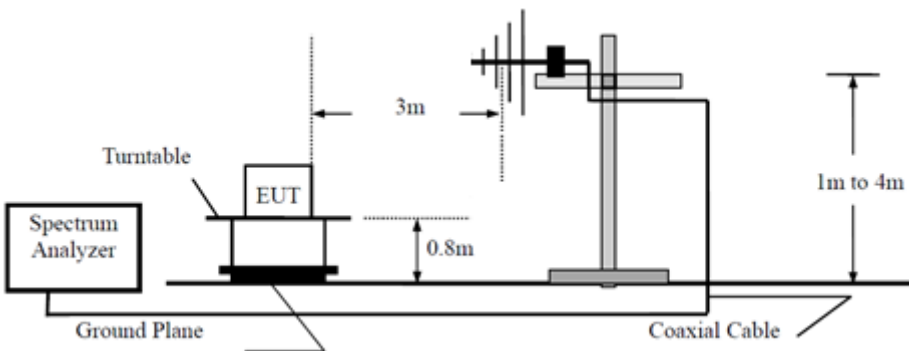
7 Test setups

7.1 AC Power Line Conducted Emission test setups

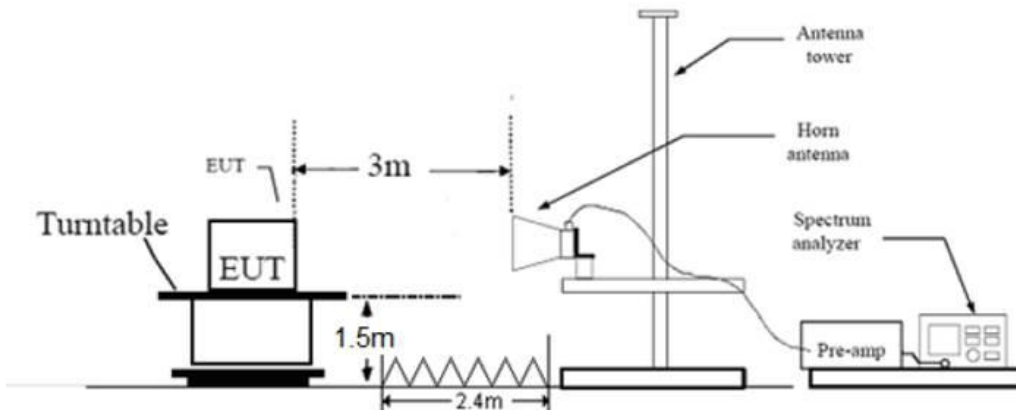


7.2 Radiated test setups

Below 1GHz



Above 1GHz



8 Technical Requirement

8.1 Conducted Emission

Test Method

1. The EUT was placed on a table, which is 0.8m above ground plane
2. The power line of the EUT is connected to the AC mains through a Artificial Mains Network (A.M.N.).
3. Maximum procedure was performed to ensure EUT compliance
4. A EMI test receiver is used to test the emissions from both sides of AC line

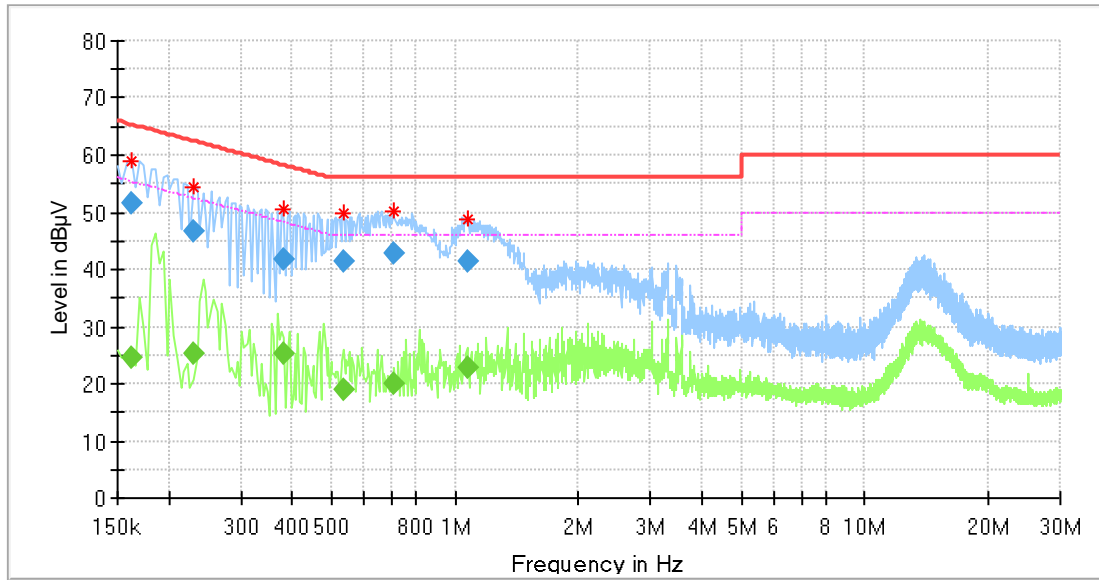
Limit

Frequency MHz	QP Limit dB μ V	AV Limit dB μ V
0.150-0.500	66-56*	56-46*
0.500-5	56	46
5-30	60	50

*Decreasing linearly with logarithm of the frequency.

Conducted Emission

Product Type : Microwave sensor for Ceiling light
 M/N : LM57176
 Operating Condition : Normal working with transmitting
 Test specification : Positive
 Comment : AC 120V/60Hz (Powered by Ceiling Light)



Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.162500	---	24.49	55.34	30.85	L1	10.2
0.162500	51.58	---	65.34	13.76	L1	10.2
0.229500	---	25.32	52.47	27.15	L1	10.2
0.229500	46.55	---	62.47	15.92	L1	10.2
0.381500	---	25.31	48.25	22.94	L1	10.3
0.381500	41.60	---	58.25	16.65	L1	10.3
0.537500	---	19.08	46.00	26.92	L1	10.3
0.537500	41.45	---	56.00	14.55	L1	10.3
0.705500	---	19.84	46.00	26.16	L1	10.3
0.705500	42.82	---	56.00	13.18	L1	10.3
1.069500	---	22.79	46.00	23.21	L1	10.3
1.069500	41.47	---	56.00	14.53	L1	10.3

Remark :

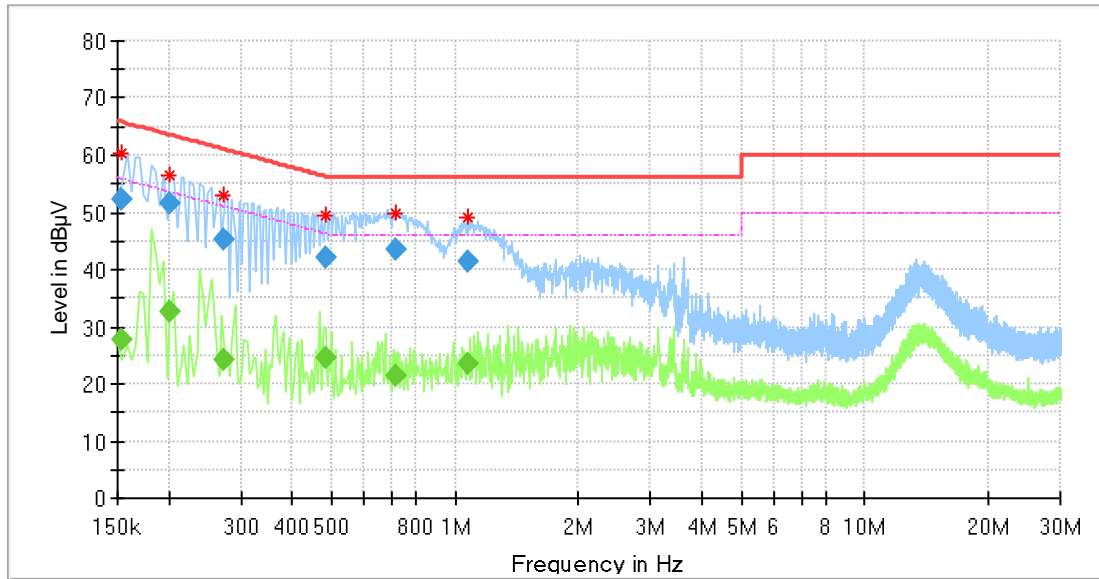
Level=Reading Level + Correction Factor

Correction Factor=Cable Loss + LISN Factor

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

Conducted Emission

Product Type : Microwave sensor for Ceiling light
 M/N : LM57176
 Operating Condition : Normal working with transmitting
 Test specification : Negative
 Comment : AC 120V/60Hz (Powered by Ceiling Light)



Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.153500	---	27.61	55.81	28.20	N	10.3
0.153500	52.18	---	65.81	13.63	N	10.3
0.201500	---	32.65	53.55	20.90	N	10.2
0.201500	51.41	---	63.55	12.14	N	10.2
0.273500	---	24.36	51.01	26.65	N	10.2
0.273500	45.09	---	61.01	15.92	N	10.2
0.485500	---	24.60	46.24	21.64	N	10.3
0.485500	42.12	---	56.24	14.12	N	10.3
0.713500	---	21.47	46.00	24.53	N	10.3
0.713500	43.42	---	56.00	12.58	N	10.3
1.077500	---	23.41	46.00	22.59	N	10.3
1.077500	41.49	---	56.00	14.51	N	10.3

Remark :

Level=Reading Level + Correction Factor

Correction Factor=Cable Loss + LISN Factor

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

8.2 Field strength of emissions and Restricted bands

Test Method

- 1: The EUT was placed on a turn table which is 1.5m above ground plane for above 1GHz and 0.8m above ground for below 1GHz at 3-meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- 2: The EUT was set 3 meters away from the interference – receiving antenna, which was mounted on the top of a variable – height antenna tower.
- 3: The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- 4: For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- 5: Use the following spectrum analyzer settings According to C63.10:

For Above 1GHz

Span = wide enough to capture the peak level of the in-band emission and all spurious
RBW = 1MHz, VBW \geq RBW for peak measurement and VBW = 10Hz for average measurement, Sweep = auto, Detector function = peak, Trace = max hold.

For Below 1GHz

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 for peak measurement, Sweep = auto, Detector function = peak, Trace = max hold.

Note:

- 1: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 KHz for Quasi-peak detection (QP) at frequency below 1GHz.
- 2: The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for peak detection (PK) at frequency above 1GHz.
- 3: The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for RMS Average ((duty cycle < 98%) for Average detection (AV) at frequency above 1GHz, then the measurement results was added to a correction factor (20log (1/duty cycle)).
- 4: The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz (duty cycle > 98%) for Average detection (AV) at frequency above 1GHz.

Field strength of emissions and Restricted bands

Limits

According to §15.249 (a) & RSS-210 A2.9(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)& RSS-210 B.10, Field strength limits are specified at a distance of 3 meters.

According to §15.249 (d)& RSS-210 B.10, 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& RSS-Gen, whichever is the lesser attenuation.

According to §15.205 and RSS-GEN 8.10 Unwanted emissions falling into restricted bands in §15.205 (a) and RSS-GEN 8.10 Table 7 shall comply with the limits specified in §15.209 and RSS-Gen.

Frequency MHz	Field Strength uV/m	Field Strength dBµV/m	Detector
30-88	100	40	QP
88-216	150	43.5	QP
216-960	200	46	QP
960-1000	500	54	QP
Above 1000	500	54	AV
Above 1000	5000	74	PK

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: Microwave sensor for Ceiling light
M/N: LM57176
Operating Condition: Tx; 5734MHz

For Peak Value

Radiated Emission								
Value	Emissions Frequency MHz	E-Field Polarity	Reading Level dB μ V/m	Correction Factor dB	PK Emission dB μ V/m	Limit dB μ V/m	Margin dBm	Emission Type
For Below 1GHz								
PK	943.255000	H	52.50	-15.3	37.20	46.00	8.80	Spurious
PK	943.147222	V	51.37	-15.3	36.07	46.00	9.93	Spurious
For Above 1GHz								
PK	1274.687500	H	46.97	-12.0	34.97	74.00	39.03	Spurious
PK	1252.750000	V	44.88	-12.1	32.78	74.00	41.22	Spurious
PK	5734.000000	H	68.42	3.8	72.22	114.00	41.78	Fundamental
PK	5734.000000	V	70.36	3.8	74.16	114.00	39.84	Fundamental
PK	17617.062500	H	28.24	21.2	49.44	74.00	24.56	Spurious
PK	17801.656250*	V	27.59	21.3	48.89	74.00	25.11	Spurious

For AV Value

Radiated Emission										
Value	Emissions Frequency MHz	E-Field Polarity	Reading Level dB μ V/m	Correction Factor dB	AV Reading Level dB μ V/m	Average Factor dB	AV Emission dB μ V/m	Limit dB μ V/m	Margin dBm	Emission Type
AV	5734.000000	H	67.82	3.8	/	0	71.62	94.00	22.38	Fundamental
AV	5734.000000	V	70.12	3.8	/	0	73.92	94.00	20.08	Fundamental
AV	/	H			/	0		54.00	/	Spurious
AV	/	V			/	0		54.00	/	Spurious

Average Factor=10log(dutycycle), dutycycle=100%

Remark:

- 1: Data of measurement within this frequency range shown "/" in the table above means the reading of emissions are attenuated more than 20db below the permissible limits or the field strength is too small to be measured.
- 2: "*" means the emission(s) appear within the restrict bands shall follow the requirement of section 15.205.
- 3: AV Emission Level= AV Reading Level+10log(1/dutycycle)
- 4: PK Emission = Reading Level + Correction Factor
AV Emission = Reading Level + Correction Factor
Correction Factor=Antenna Factor + Cable Loss (For Below 1GHz)
Correction Factor = Antenna Factor + Cable Loss- Amplifier Gain (For Above 1GHz)
(The Reading Level is recorded by software which is not shown in the sheet)

Field strength of emissions and Restricted bands

EUT: Microwave sensor for Ceiling light

M/N: LM57176

Operating Condition: Tx; 5795MHz

For Peak Value

Radiated Emission								
Value	Emissions Frequency MHz	E-Field Polarity	Reading Level dB μ V/m	Correction Factor dB	PK Emission dB μ V/m	Limit dB μ V/m	Margin dBm	Emission Type
For Above 1GHz								
PK	1271.875000	H	47.71	-12.0	35.71	74.00	38.29	Spurious
PK	1254.062500	V	44.67	-12.0	32.67	74.00	41.33	Spurious
PK	5795.000000	H	74.33	3.6	77.93	114.00	36.07	Fundamental
PK	5795.000000	V	76.27	3.6	79.87	114.00	34.13	Fundamental
PK	11589.062500*	H	41.03	8.7	49.73	74.00	24.27	Spurious
PK	17903.406250*	V	27.76	21.5	49.26	74.00	24.74	Spurious

For AV Value

Radiated Emission										
Value	Emissions Frequency MHz	E-Field Polarity	Reading Level dB μ V/m	Correction Factor dB	AV Reading Level dB μ V/m	Average Factor dB	AV Emission dB μ V/m	Limit dB μ V/m	Margin dBm	Emission Type
AV	5795.000000	H	73.85	3.6	/	0	77.45	94.00	16.55	Fundamental
AV	5795.000000	V	75.93	3.6	/	0	79.53	94.00	14.47	Fundamental
AV	/	H			/	0		54.00	/	Spurious
AV	/	V			/	0		54.00	/	Spurious
Average Factor=10log(dutycycle), dutycycle=100%										

Remark:

- 1: Data of measurement within this frequency range shown "/" in the table above means the reading of emissions are attenuated more than 20db below the permissible limits or the field strength is too small to be measured.
- 2: "*" means the emission(s) appear within the restrict bands shall follow the requirement of section 15.205.
- 3: AV Emission Level= AV Reading Level+10log(1/dutycycle)
- 4: PK Emission = Reading Level + Correction Factor
AV Emission = Reading Level + Correction Factor
Correction Factor=Antenna Factor + Cable Loss (For Below 1GHz)
Correction Factor = Antenna Factor + Cable Loss- Amplifier Gain (For Above 1GHz)
(The Reading Level is recorded by software which is not shown in the sheet)

Field strength of emissions and Restricted bands

EUT: Microwave sensor for Ceiling light

M/N: LM57176

Operating Condition: Tx; 5858MHz

For Peak Value

Radiated Emission								
Value	Emissions Frequency MHz	E-Field Polarity	Reading Level dB μ V/m	Correction Factor dB	PK Emission dB μ V/m	Limit dB μ V/m	Margin dBm	Emission Type
For Above 1GHz								
PK	1263.250000	H	46.41	-12.0	34.41	74.00	39.59	Spurious
PK	1251.812500	V	43.61	-12.1	31.51	74.00	42.49	Spurious
PK	5858.000000	H	53.94	3.3	57.24	114.00	16.76	Fundamental
PK	5858.000000	V	66.56	3.3	69.86	114.00	4.14	Fundamental
PK	17671.031250	H	27.77	21.3	49.07	74.00	24.93	Spurious
PK	17772.093750*	V	27.83	21.3	49.13	74.00	24.87	Spurious

For AV Value

Radiated Emission										
Value	Emissions Frequency MHz	E-Field Polarity	Reading Level dB μ V/m	Correction Factor dB	AV Reading Level dB μ V/m	Average Factor dB	AV Emission dB μ V/m	Limit dB μ V/m	Margin dBm	Emission Type
AV	5858.000000	H	53.94	3.3	/	0	57.24	94.00	36.76	Fundamental
AV	5858.000000	V	66.56	3.3	/	0	69.86	94.00	24.14	Fundamental
AV	/	H			/	0		54.00	/	Spurious
AV	/	V			/	0		54.00	/	Spurious
Average Factor=10log(dutycycle), dutycycle=100%										

Remark:

- 1: Data of measurement within this frequency range shown "/" in the table above means the reading of emissions are attenuated more than 20db below the permissible limits or the field strength is too small to be measured.
- 2: "*" means the emission(s) appear within the restrict bands shall follow the requirement of section 15.205.
- 3: AV Emission Level= AV Reading Level+10log(1/dutycycle)
- 4: PK Emission = Reading Level + Correction Factor
AV Emission = Reading Level + Correction Factor
Correction Factor=Antenna Factor + Cable Loss (For Below 1GHz)
Correction Factor = Antenna Factor + Cable Loss- Amplifier Gain (For Above 1GHz)
(The Reading Level is recorded by software which is not shown in the sheet)

8.3 Out of Band Emissions

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.

Limits

According to §15.249(d) & RSS-210 B.10 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 and RSS-Gen, whichever is the lesser attenuation.

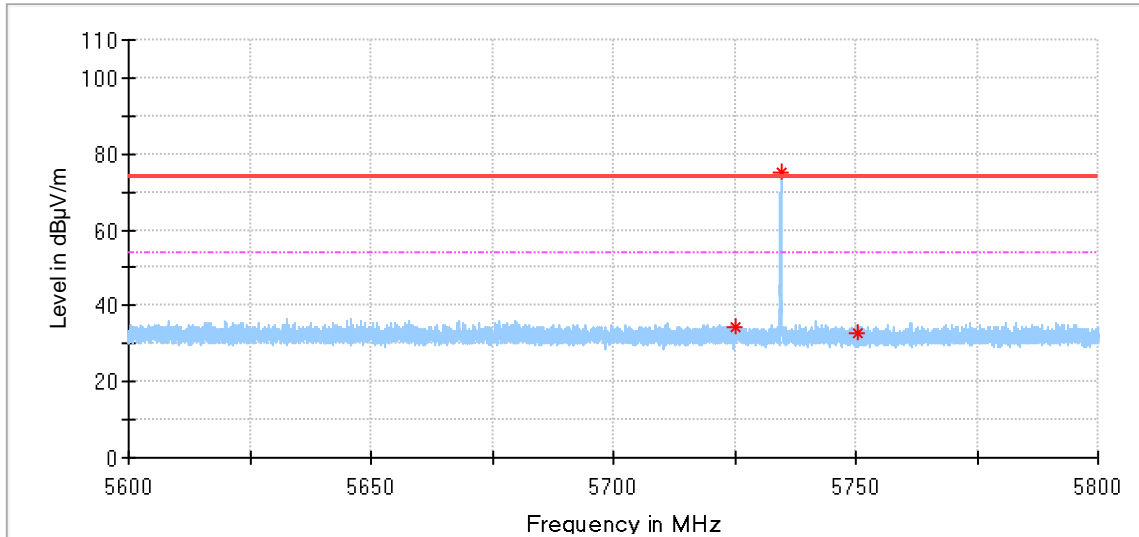
Out of Band Emissions

EUT: Microwave sensor for Ceiling light

M/N: LM57176

Operating Condition: Tx; 5734MHz

Polarization: Horizontal



Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
5725.150000	34.56	74.00	39.44	---	---	154.0	H	171.0	3.8
5734.593750	75.07	74.00	-1.07	---	---	154.0	H	207.0	3.8
5750.231250	32.98	74.00	41.02	---	---	154.0	H	0.0	3.7

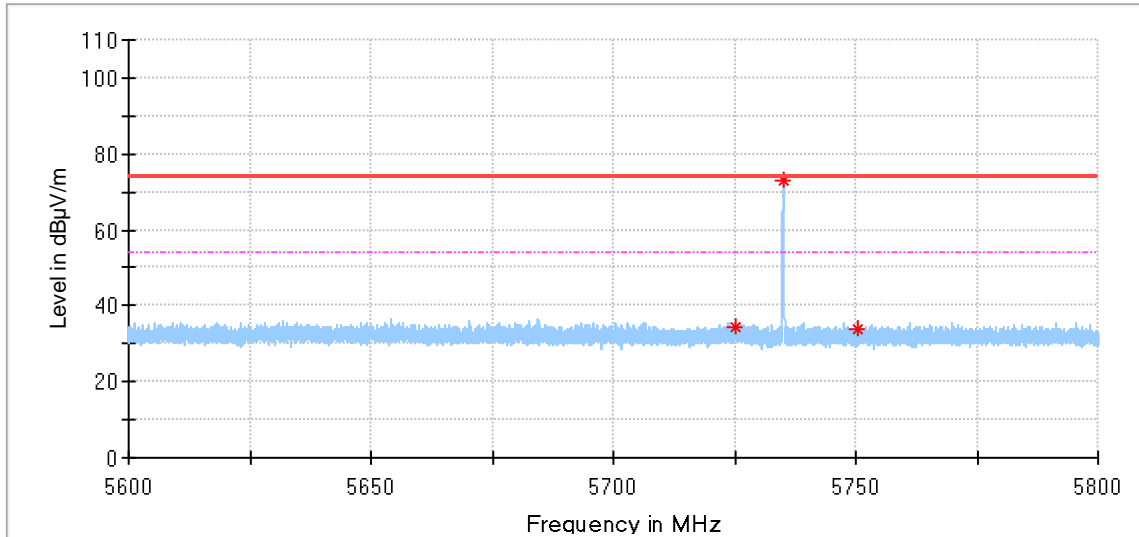
Out of Band Emissions

EUT: Microwave sensor for Ceiling light

M/N: LM57176

Operating Condition: Tx; 5734MHz

Polarization: Vertical



Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
5725.250000	34.57	74.00	39.43	---	---	154.0	V	340.0	3.8
5735.137500	72.97	74.00	1.03	---	---	154.0	V	300.0	3.8
5750.312500	33.93	74.00	40.07	---	---	154.0	V	10.0	3.7

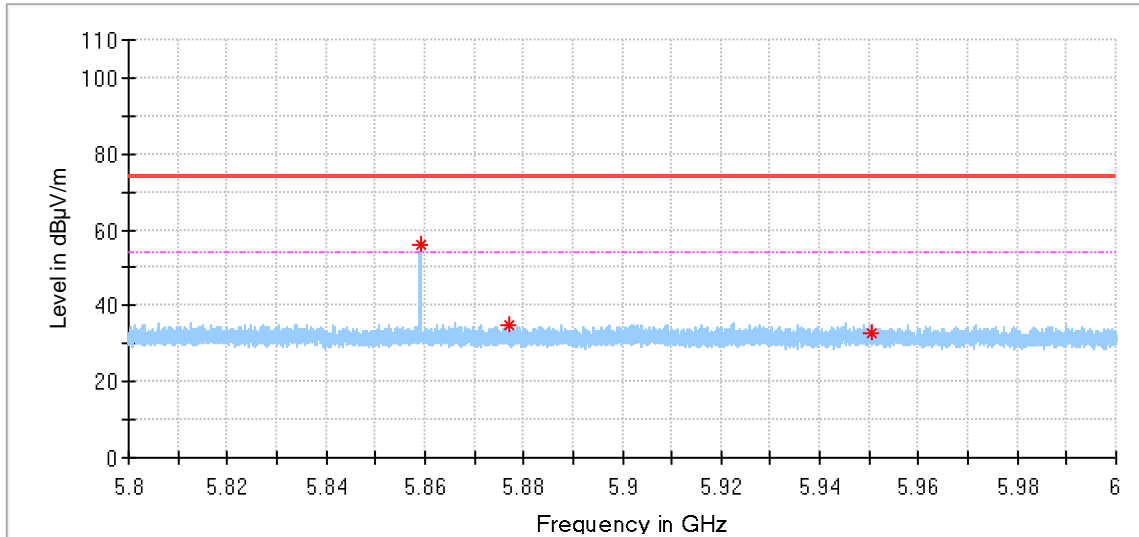
Out of Band Emissions

EUT: Microwave sensor for Ceiling light

M/N: LM57176

Operating Condition: Tx; 5858MHz

Polarization: Horizontal



Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
5859.125000	56.31	74.00	17.69	---	---	154.0	H	204.0	3.3
5877.250000	34.73	74.00	39.27	---	---	154.0	H	160.0	3.3
5950.418750	32.76	74.00	41.24	---	---	154.0	H	94.0	3.2

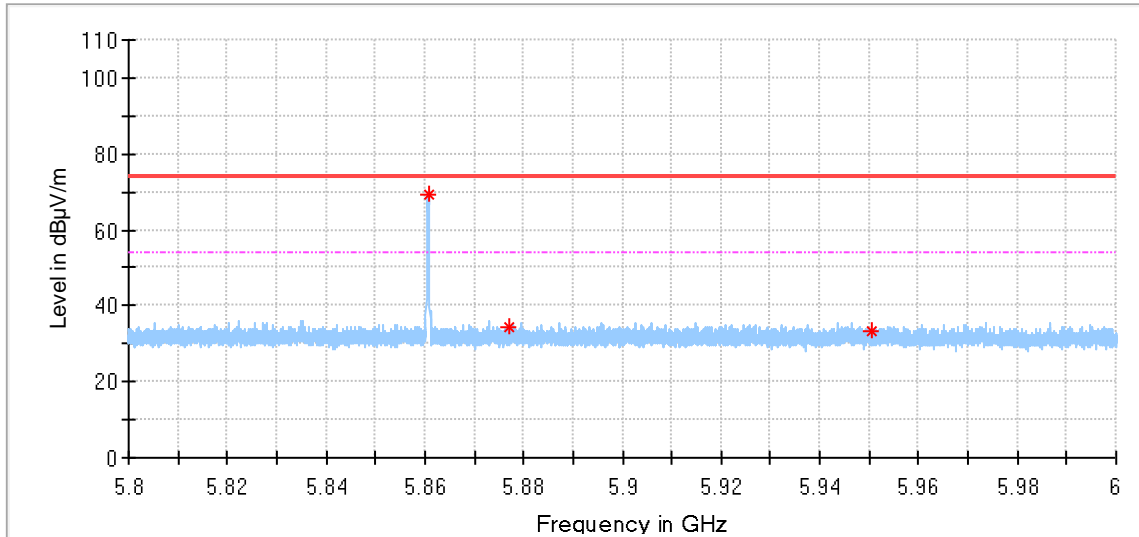
Out of Band Emissions

EUT: Microwave sensor for Ceiling light

M/N: LM57176

Operating Condition: Tx; 5858MHz

Polarization: Vertical



Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
5860.837500	69.26	74.00	4.74	---	---	154.0	V	4.0	3.3
5877.025000	34.54	74.00	39.46	---	---	154.0	V	15.0	3.3
5950.631250	33.42	74.00	40.58	---	---	154.0	V	353.0	3.2

8.4 20dB Bandwidth & 99% Occupied 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.

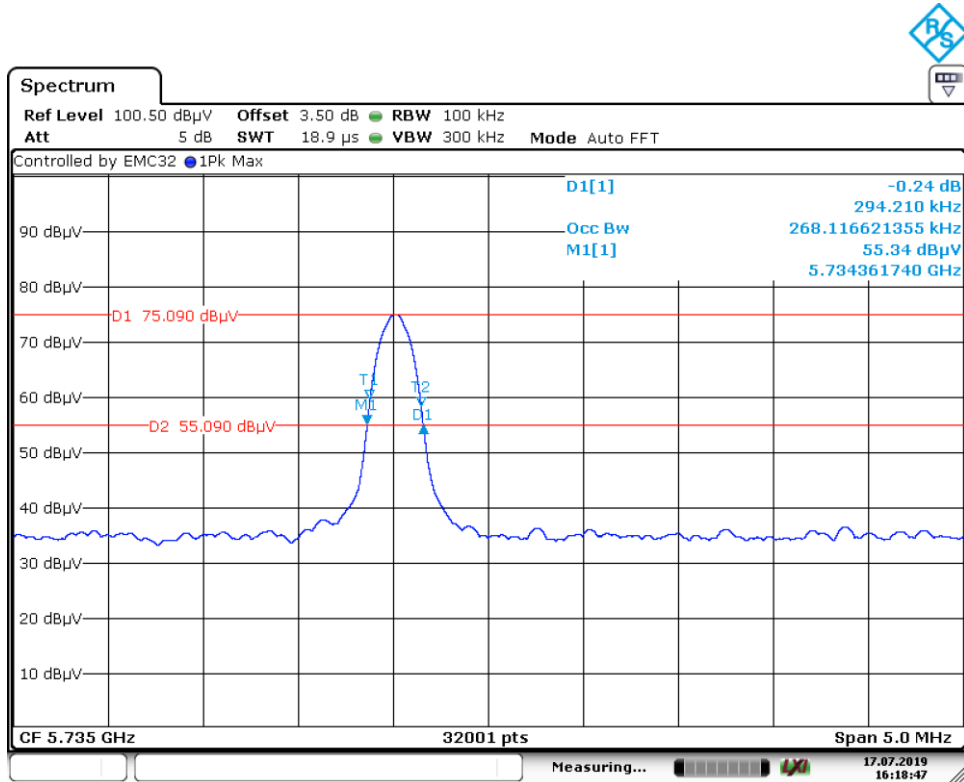
Limits:

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.

According to RSS-Gen 6.7 when an occupied bandwidth value is not specified in the applicable RSS, the transmitted signal bandwidth to be reported is to be its 99% emission bandwidth, as calculated or measured.

20dB Bandwidth & 99% Occupied Bandwidth

Frequency	20dB Bandwidth	99% Bandwidth	Limit
MHz	KHz	kHz	kHz
5734	294.21	268.11	--

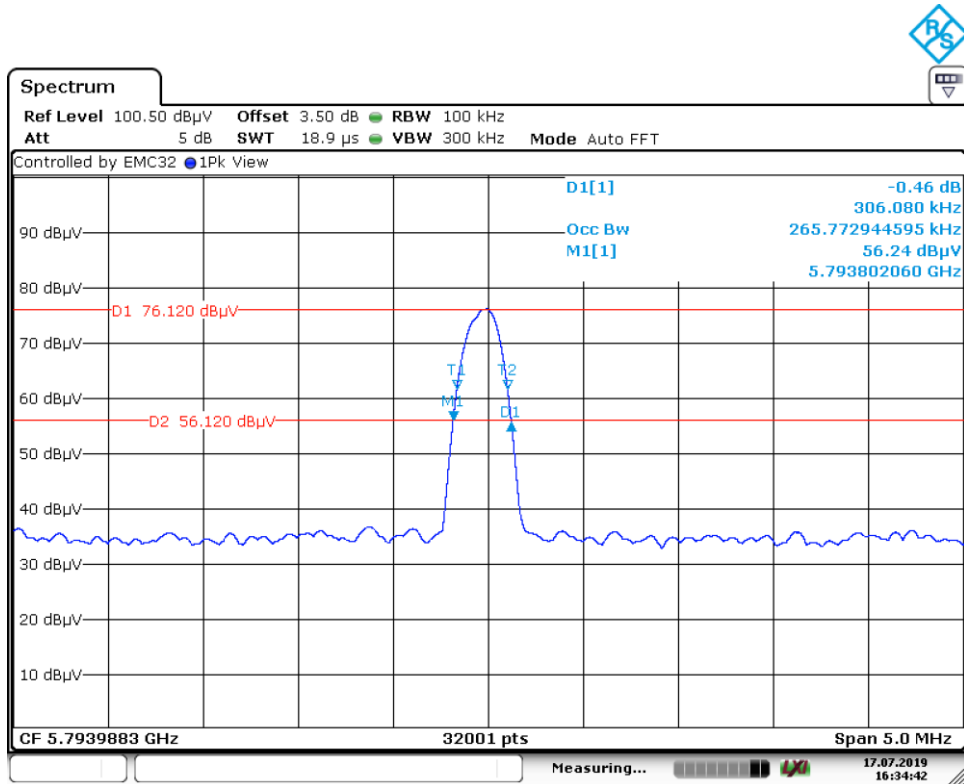


Date: 17.JUL.2019 16:18:48

5734MHz

20dB Bandwidth & 99% Occupied Bandwidth

Frequency	20dB Bandwidth	99% Bandwidth	Limit
MHz	KHz	kHz	kHz
5795	306.08	265.77	--

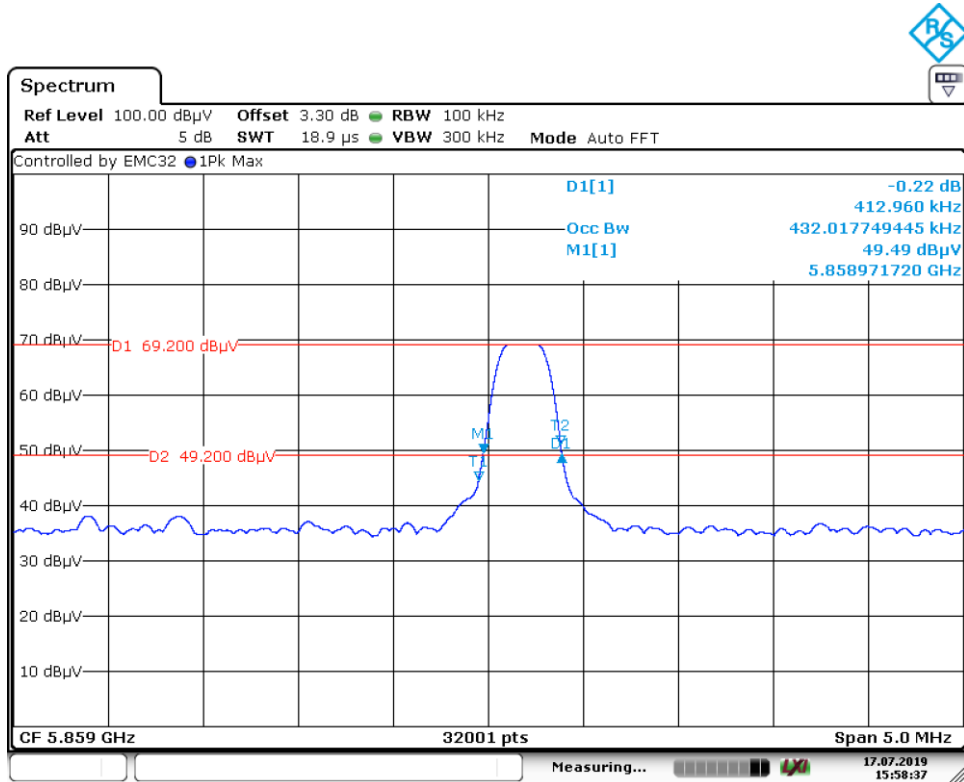


Date: 17.JUL.2019 16:34:42

5795MHz

20dB Bandwidth & 99% Occupied Bandwidth

Frequency	20dB Bandwidth	99% Bandwidth	Limit
MHz	KHz	kHz	kHz
5858	412.96	432.01	--



Date: 17.JUL.2019 15:58:37

5858MHz

9 Test equipment lists

List of Test Instruments

Radiated Emission Test

DESCRIPTION	MANUFACTURER	MODEL NO.	EQUIPMENT ID	SERIAL NO.	CAL. DUE DATE
EMI Test Receiver	Rohde & Schwarz	ESR 26	68-4-74-14-002	101269	2020-6-28
Horn Antenna	Rohde & Schwarz	HF907	68-4-80-14-005	102294	2020-6-22
Loop Antenna	Rohde & Schwarz	HFH2-Z2	68-4-80-14-006	100398	2020-7-7
Pre-amplifier	Rohde & Schwarz	SCU 18	68-4-29-14-001	102230	2020-6-28
Signal Generator	Rohde & Schwarz	SMY01	68-4-48-16-001	839369/005	2020-6-28
Attenuator	Agilent	8491A	68-4-81-16-001	MY39264334	2020-6-28
3m Semi-anechoic chamber	TDK	9X6X6	68-4-90-14-001	----	2020-7-7
Test software	Rohde & Schwarz	EMC32	68-4-90-14-001-A10	Version9.15.00	N/A

Conducted Emission Test

DESCRIPTION	MANUFACTURER	MODEL NO.	EQUIPMENT ID	SERIAL NO.	CAL. DUE DATE
EMI Test Receiver	Rohde & Schwarz	ESR 3	68-4-74-14-001	101782	2020-6-28
LISN	Rohde & Schwarz	ENV4200	8-4-87-14-001	100249	2020-6-28
LISN	Rohde & Schwarz	ENV432	68-4-87-16-001	101318	2020-7-19
LISN	Rohde & Schwarz	ENV216	68-4-87-14-002	100326	2020-6-28
ISN	Rohde & Schwarz	ENY81	68-4-87-14-003	100177	2020-6-28
ISN	Rohde & Schwarz	ENY81-CA6	68-4-87-14-004	101664	2020-6-28
High Voltage Probe	Rohde & Schwarz	TK9420(VT9420)	68-4-27-14-001	9420-584	2020-6-24
RF Current Probe	Rohde & Schwarz	EZ-17	68-4-27-14-002	100816	2020-7-2
Attenuator	Shanghai Huaxiang	TS2-26-3	68-4-81-16-003	080928189	2020-6-28
Test software	Rohde & Schwarz	EMC32	68-4-90-14-003-A10	Version9.15.00	N/A

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
Uncertainty for Radiated Emission in 3m chamber 30MHz-1000MHz	Horizontal: 4.91dB; Vertical: 4.89dB;
Uncertainty for Radiated Spurious Emission 25MHz-3000MHz	Horizontal: 4.80dB; Vertical: 4.87dB;
Uncertainty for Radiated Spurious Emission 3000MHz-18000MHz	Horizontal: 4.59dB; Vertical: 4.58dB;
Uncertainty for Radiated Spurious Emission 18000MHz-40000MHz	Horizontal: 5.05dB; Vertical: 5.04dB;
Uncertainty for Conducted Emission 150kHz-30MHz (for test using AMN ENV432 or ENV4200)	3.21dB