

FCC/IC - TEST REPORT

Report Number	:	68.950.18.0211.0	1	Date of Issue:	June 21, 2018
Model	:	SPTM1			
Product Type	:	Camera			
Applicant	:	GoPro, Inc.			
Address	:	3000 Clearview W	'ay, San Ma	ateo, CA 94402,	USA
Production Facility	:	GoPro, Inc.			
Address	:	3000 Clearview W	'ay, San Ma	ateo, CA 94402,	USA
Test Result	:	Positive	□ Negati [®]	ve	
Total pages including Appendices	:	30			

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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 Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District, Shenzhen City, 518052, P. R. China
FCC Registration Number:	514049
IC Registration Number:	10320A-1
Telephone: Fax:	86 755 8828 6998 86 755 8828 5299



3 Description of the Equipment under Test

Product:	Camera
Model no.:	SPTM1
IC:	10193A-SPTM1
FCC ID:	CNFSPTM1
Rating:	3.85Vdc
RF Transmission	2402MHz-2480MHz
Frequency: No. of Operated Channel:	40
Modulation:	GFSK
Antenna Type:	Integrated Metal Antenna
Antenna Gain:	0.5dBi max for 2.4GHz
Description of the EUT:	The Equipment Under Test (EUT) is a Camera supports 2.4GHz Bluetooth/WIFI, 5GHz WIFI functions.



4 Summary of Test Standards

	Test Standards
FCC Part 15 Subpart C	PART 15 - RADIO FREQUENCY DEVICES
10-1-2017 Edition	Subpart C - Intentional Radiators
RSS-Gen Issue 5 April 2018	RSS-Gen — General Requirements for Compliance of Radio Apparatus
RSS-247 Issue 2 February 2017	Digital Transmission Systems (DTS), Frequency Hopping Systems (FHSS) and License-Exempt Local Area Network (LE-LAN) Devices

All the test methods were according to KDB558074 D01 DTS Meas Guidance v04 and ANSI C63.10 (2013).



5 Summary of Test Results

Technical Requirements						
	ibpart C/RSS-247	7 Issue 2/RSS-Gen Issue 5				
Test Condition			Pages	Test Result	Test Site	
§15.207	RSS-GEN 8.8	Conducted emission AC power port	10	Pass	Site 1	
§15.247(b)(1)	RSS-247 Clause 5.4(b)	Conducted AV output power for FHSS		N/A		
§15.247(b)(3)	RSS-247 Clause 5.4(d)	Conducted AV output power for DTS	13	Pass	Site 1	
§15.247(e)	RSS-247 Clause 5.2(b)	Power spectral density	18	Pass	Site 1	
§15.247(a)(2)	RSS-247 Clause 5.2(a)	6dB bandwidth	14	Pass	Site 1	
§15.247(a)(1)	RSS-247 Clause 5.1(a)	20dB Occupied bandwidth		N/A		
	RSS-GEN 6.7	99% Occupied Bandwidth	16	Pass	Site 1	
§15.247(a)(1)	RSS-247 Clause 5.1(b)	Carrier frequency separation		N/A		
§15.247(a)(1)(i ii)	RSS-247 Clause 5.1(d)	Number of hopping frequencies		N/A		
§15.247(a)(1)(i ii)	RSS-247 Clause 5.1(d)	Dwell Time		N/A		
§15.247(d)	RSS-247 Clause 5.5	Spurious RF conducted emissions	20	Pass	Site 1	
§15.247(d)	RSS-247 Clause 5.5	Band edge	23	Pass	Site 1	
§15.247(d) & §15.209 & §15.205	RSS-247 Clause 5.5 & RSS-GEN 6.13 RSS-GEN 8.9 RSS-GEN 8.10	Spurious radiated emissions for transmitter	25	Pass	Site 1	
§15.203	RSS-GEN 6.8	Antenna requirement	See note 1	Pass		

Remark 1: N/A – Not Applicable.

Note 1: The EUT uses an Integrated Metal Antenna 0.5dBi max. According to §15.203, it is considered sufficiently to comply with the provisions of this section.



6 General Remarks

Remarks

This submittal(s) (test report) is intended for FCC ID: CNFSPTM1, IC: 10193A-SPTM1, complies with Section 15.207, 15.209, 15.205, 15.247 of the FCC Part 15, Subpart C and RSS 247 and RSS-Gen rules.

The Model: SPTM1 supports Bluetooth BR+EDR/Bluetooth Low Energy/WIFI/GPS & Galileo receiving functions, power by 3.85Vdc, 1220mAh supplied by an internal rechargeable Lithium Ion Battery or 5Vdc supplied by USB type C port.

The TX and RX range is 2402MHz-2480MHz for Bluetooth, 2412MHz – 2462MHz for 2.4GHzWIFI, 5180MHz – 5320MHz, 5500MHz – 5700MHz, 5745MHz – 5825MHz for 5GHzWIFI, 1575.42MHz for GNSS (only GPS and Galileo) Receiver, also supports two versions (Version W and Version S), the Version W is identical with the Version S except of the Version S is Dark grey color with GPS & Galileo receiving function, supported resolutions:4K/30fps, 1440/30fps, 1440/60fps and 960/90fps. The Version W is Light grey color without GPS & Galileo receiving function; supported resolutions: 1440/30fps and 1440/60fps, therefore Spurious Emissions was tested with the two versions, and the others test items were only performed on the Version S.

This report is for the Bluetooth Low Energy part.

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 09, 2018

Testing Start Date:

May 09, 2018

Testing End Date:

June 06, 2018

- TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch -Reviewed by: Prepared by: Tested by:

Laurent Yuan EMC Project Manager

Aaron Lai EMC Project Engineer

Louise Liu EMC Test Engineer

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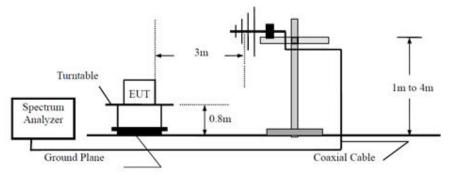
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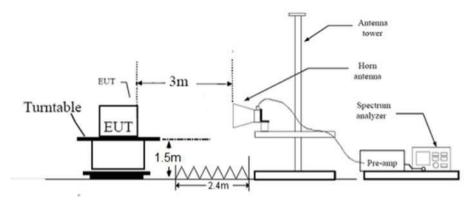
7 Test Setups

7.1 Radiated test setups

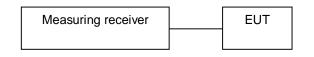
Below 1GHz



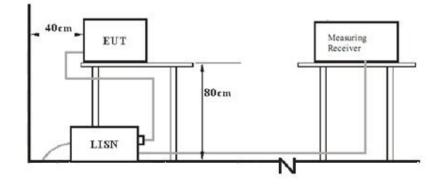
Above 1GHz



7.2 Conducted RF test setups



7.3 AC Power Line Conducted Emission test setups



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8 Systems test configuration

Auxiliary Equipment Used during Test:

DESCRIPTION	MANUFACTURER	MODEL NO.	S/N
Laptop	Lenovo	T460S	
USB Type C cable	GoPro	0.55m (Length)	
AC Adapter	Apple	A1401	

Test software information:

Test Software Version	QRCT (V3.0-00230) from QUALCO	MM
Modulation	Setting TX Power	Packet Type
GFSK	/	/

The system was configured to channel 0, 19, and 39 for the test.



9 Technical Requirement

9.1

9.1 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

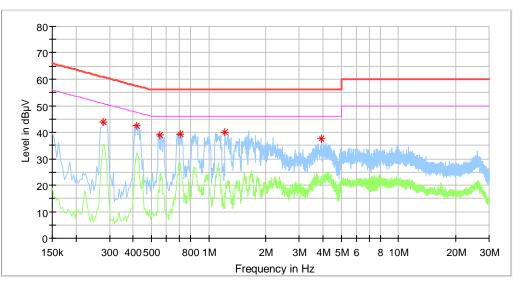
Frequency	QP Limit	AV Limit
MHz	dBµV	dBµV
0.150-0.500	66-56*	56-46*
0.500-5	56	46
5-30	60	50

Decreasing linea



Conducted Emission

Product Type	:	Camera
M/N	:	SPTM1
Operating Condition	:	Charging + TX
Test Specification	:	Power Line, Live
Comment	:	AC 120V/60Hz (External adapter)



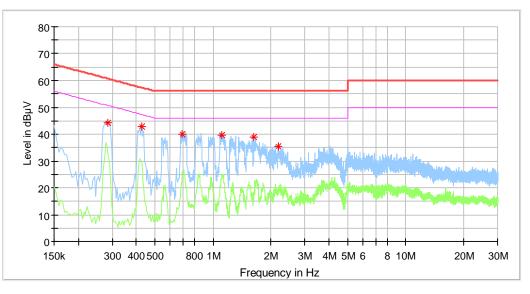
Frequency (MHz)	MaxPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.278000	43.98		60.88	16.89	L1	10.2
0.418000	42.51		57.49	14.98	L1	11.4
0.554000	38.77		56.00	17.23	L1	10.2
0.706000	39.33		56.00	16.67	L1	10.2
1.222000	40.16		56.00	15.84	L1	10.2
3.930000	37.58		56.00	18.42	L1	10.3

Remark : "*" Correct factor=cable loss + LISN factor



Conducted Emission

Product Type	:	Camera
M/N	:	SPTM1
Operating Condition	:	Charging + TX
Test Specification	:	Power Line, Neutral
Comment	:	AC 120V/60Hz (External adapter)



Frequency (MHz)	MaxPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.286000	44.27		60.64	16.37	Ν	10.3
0.426000	42.64		57.33	14.69	N	10.3
0.694000	40.05		56.00	15.95	Ν	10.4
1.114000	39.51		56.00	16.49	Ν	10.4
1.626000	38.98		56.00	17.02	Ν	10.4
2.182000	35.31		56.00	20.69	Ν	10.4

Remark : "*" Correct factor=cable loss + LISN factor

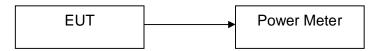


9.2 Conducted AV output power

Test Method

- 1. Setting the highest output power level of the EUT:
- 2. Connect to gated RF power meter.

Test Setup



Limits

According to §15.247 (b) (3), conducted AV output power limit as below:

Frequency Range	Limit	Limit
MHz	W	dBm
2400-2483.5	≤1	≤30

Test result as below table

	Conducted AV	
Frequency	Output Power	Result
MHz	dBm	
Top channel 2402MHz	3.10	Pass
Middle channel 2440MHz	3.10	Pass
Bottom channel 2480MHz	2.70	Pass



9.3 6dB bandwidth

Test Method

- 1. Use the following spectrum analyzer settings: RBW=100K, VBW≥3RBW, Sweep = auto, Detector function = peak, Trace = max hold
- Use the automatic bandwidth measurement capability of an instrument, may be employed using the X dB bandwidth mode with X set to 6 dB, care shall be taken so that the bandwidth measurement is not influenced by any intermediate power nulls in the fundamental emission that might be ≥ 6 dB.
- 3. Allow the trace to stabilize, record the X dB Bandwidth value.

Limit

Limit [kHz]

≥500

Test result

Test Mode	Channel (MHz)	Result (MHz)	Limit (KHz)	Verdict
BLE	2402	0.684	≥500	PASS
BLE	2440	0.692	≥500	PASS
BLE	2480	0.692	≥500	PASS

Test Graphs



Report Number: 68.950.18.0211.01 BLE_Ant1_2440 Spectrum Ref Level 30.00 dBm Att 40 dB 1Pk View Offset 0.90 dB ● RBW 100 kHz SWT 18.9 µs ● VBW 300 kHz Mode Auto FFT M1[1] -4.86 dBr 2.43969200 GH 1.18 dBr 2.44004000 GH 20 dBm M2[1] 10 dBm) dBm MI D1 -4.824 -10 dBm 20 dBm 30 dBm 40 dBn SU dBm -60 dBm 1001 pts CF 2.44 GH: 4.0 MHz ark Marker Type Ref Trc M1 1 M2 1 D3 M1 1 Y-value -4.86 dBm X-value 2.439692 GHz 2.44004 GHz 692.0 kHz Function Function Result -4.86 dBm 1.18 dBm -0.04 dB Date: 30 MAY 2018 10:22:23 BLE_Ant1_2480 Spectrum RefLevel 30.00 dBm Att 40 dB Offset 0.90 dB ● RBW 100 kHz SWT 18.9 µs ● VBW 300 kHz Mode Auto FF1 1Pk Vie M1[1] 5.20 dB -5.20 dBm 2.47969200 GH 0.84 dBm 2.48004000 GH 20 dBr M2[1] 10 dBr 0 dBm MI D1 -5.164 -10 dBm -20 dBr -30 dBn 40 dBn 50 dBm -60 dBn CF 2.48 G 1001 pt 4.0 MHz ark X-value 2.479692 GHz 2.48004 GHz 692.0 kHz Y-value Function -5.20 dBm -0.84 dBm -0.03 dB -0.03 dB Type Ref Trc Function Result M2 M Date: 30 MAY .2018 10:23:54



9.4 99% bandwidth

Test Method

- Use the following spectrum analyzer settings: RBW=100K, VBW≥3RBW, Sweep = auto, Detector function = peak, Trace = max hold
- 5. Use the automatic bandwidth measurement capability of an instrument, may be employed using the OBW bandwidth mode.
- 6. Allow the trace to stabilize, record the OBW Bandwidth value.

Limit

Limit [kHz]

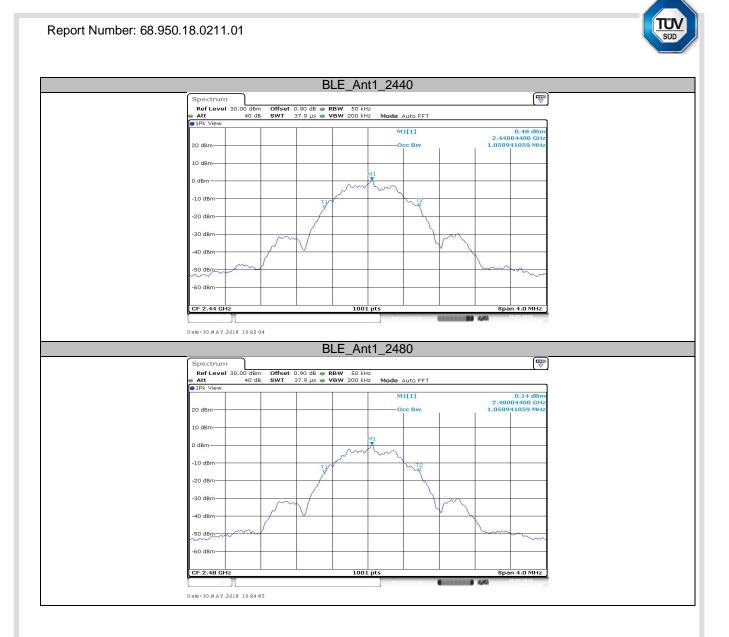
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Test result

Test Mode	Channel (MHz	Result (MHz)	Limit	Verdict
BLE	2402	1.063		PASS
BLE	2440	1.059		PASS
BLE	2480	1.059		PASS

Test Graphs







9.5 Power spectral density

Test Method

This procedure shall be used if maximum peak conducted output power was used to demonstrate compliance:

1. Set analyzer center frequency to DTS channel center frequency. RBW=100kHz,VBW≥3RBW,Span=1.5 times DTS bandwidth, Detector=Peak, Sweep=auto, Trace= max hold.

- 2. Allow trace to fully stabilize, use the peak marker function to determine the maximum amplitude level within the RBW.
- 3. Repeat above procedures until other frequencies measured were completed.

Limit

Limit [dBm]

≤8

Test result

Test Mode	Channel (MHz)	Result (dBm)	Limit	Verdict
BLE	2402	1.30	8	PASS
BLE	2440	1.18	8	PASS
BLE	2480	0.83	8	PASS

Test Graphs



Report Number: 68.950.18.0211.01 BLE_Ant1_2440 Spectrum Ref Level 20.90 dBm Att 30 dB 1Pk Max Offset 0.90 dB ● RBW 100 kHz SWT 19 µs ● VBW 300 kHz Mode Auto FFT M1[1] 1.18 dBn 2.44004050 GH 10 dBr 41) dBn -10 dBn -20 dBn -30 dBm 40 dBn -50 dBn -60 dBr 70 dBn 69<u>1 pt</u> 4.0 MHz CF 2.44 GH 1 44 Date: 30 MAY 2018 10:22:47 BLE_Ant1_2480 Spectrum Att 30 dB SWT 19 µs VBW 300 kHz Att 30 dB SWT 19 µs VBW 300 kHz Mode Auto FFT M1[1] 0.83 dBr 2.48004050 GH 10 dBm 41 0 dBr -10 dBn -20 dBn -30 dBm 40 dBr -50 dBm--60 dBn 70 dBm 691 pts 4.0 MHz CF 2.48 G AND INCOMENTATION AND Date: 30 MAY 2018 10:24:18



9.6 Spurious RF conducted emissions

Test Method

- 1. Establish a reference level by using the following procedure:
 - a. Set RBW=100 kHz. VBW≥3RBW. Detector =peak, Sweep time = auto couple, Trace mode = max hold.
 - b. Allow trace to fully stabilize, use the peak marker function to determine the maximum PSD level.
- 2. Use the maximum PSD level to establish the reference level.
 - a. Set the center frequency and span to encompass frequency range to be measured.
 - b. Use the peak marker function to determine the maximum amplitude level. Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) are attenuated by at least the minimum requirements, report the three highest emissions relative to the limit.
- 3. Repeat above procedures until other frequencies measured were completed.

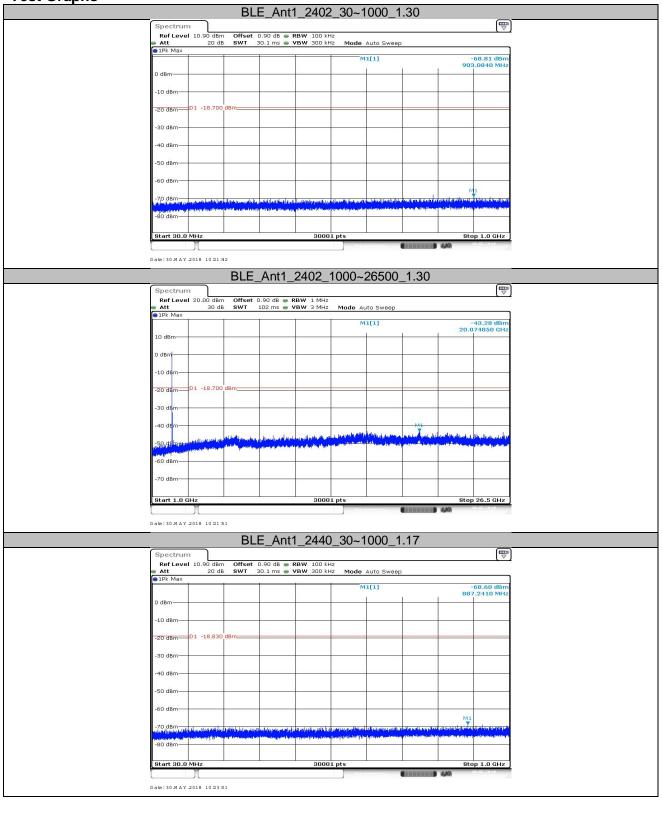
Limit

Frequency Range MHz	Limit (dBc)
30-25000	-20

Test Result

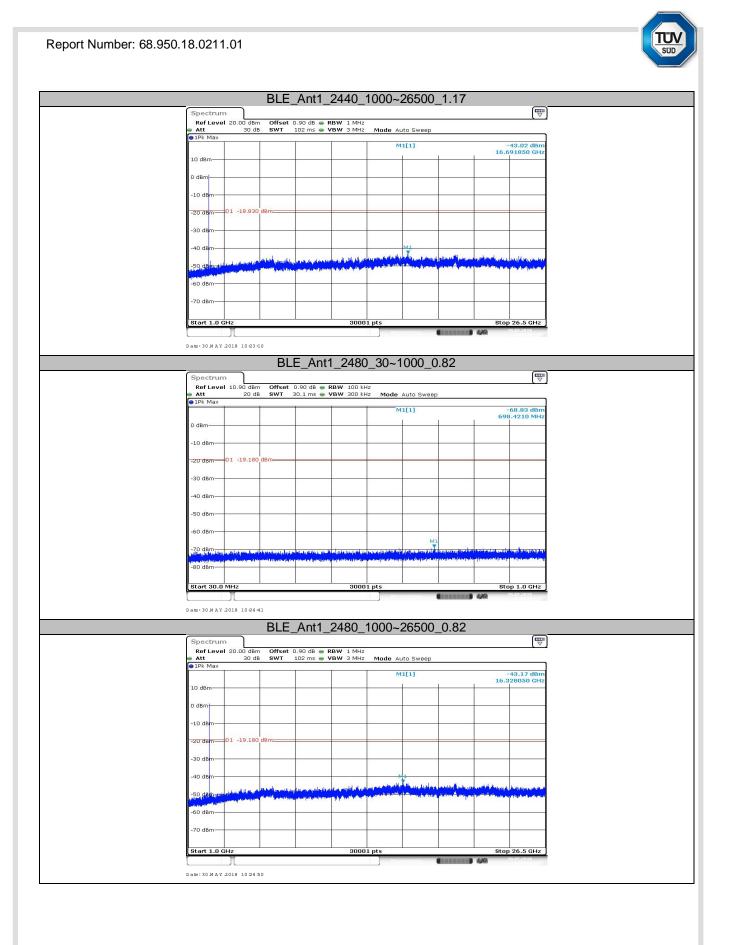
Test Mode	Channel (MHz)	Freq Range (MHz)	Result (dBm)	Limit (dBm)	Verdict
BLE	2402	30~1000	-68.81	-18.7	PASS
BLE	2402	1000~26500	-43.28	-18.7	PASS
BLE	2440	30~1000	-68.6	-18.83	PASS
BLE	2440	1000~26500	-43.02	-18.83	PASS
BLE	2480	30~1000	-68.83	-19.18	PASS
BLE	2480	1000~26500	-43.17	-19.18	PASS





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9.7 Band edge

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 $RBW = 100 \text{ kHz}, VBW \ge RBW$, 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.

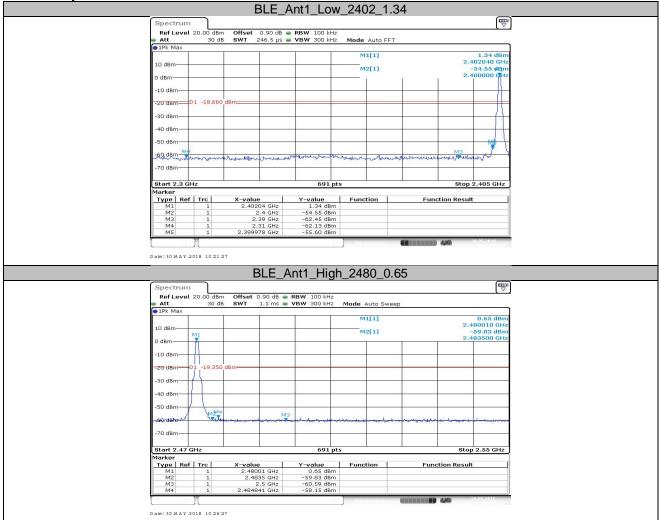
Limit

Frequency Range MHz	Limit (dBc)
30-25000	-20

Test result

Test Mode	Ch Name	Channel (MHz)	Result (dBm)	Limit	Verdict
BLE	Low	2402	-55.6	-18.66	PASS
BLE	High	2480	-58.15	-19.35	PASS

Test Graphs





9.8 Spurious radiated emissions for transmitter

Test Method

1: The EUT was place 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≥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≥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.



Limit

The radio emission outside the operating frequency band shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power. Radiated emissions which fall in the restricted bands, as defined in section15.205, must comply with the radiated emission limits specified in section 15.209.

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



Spurious radiated emissions for transmitter

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.

Transmitting spurious emission test result as below:

SPTM1 (Versic	on S)			w.			
2402MHz (30M							
Frequen	cy Emission Level	Polarization	Limit	Margin	Detector	Corr.	Result
MHz	dBuV/m		dBµV/m	dB		dB	
231.16	33.35	Horizontal	46.00	12.65	QP	-28.1	Pass
232.99	33.75	Vertical	46.00	12.25	QP	-26.8	Pass
2402MHz (Abo	ve 1GHz)						
Frequen	icy Emission Level	Polarization	Limit	Margin	Detector	Corr.	Result
MHz	dBuV/m		dBµV/m	dB		dB/m	
4851.5	6 36.76	Horizontal	74.00	37.24	PK	2.5	Pass
4822.9	6 37.09	Vertical	74.00	36.91	PK	2.7	Pass
2440MHz (30N	(Hz – 1GHz)						
Frequen	Emission	Polarization	Limit	Margin	Detector	Corr.	Result
MHz	dBuV/m		dBµV/m	dB		dB	
		Horizontal			QP		Pass
		Vertical			QP		Pass
2440MHz (Abo	ve 1GHz)						
Frequen	Emission	Polarization	Limit	Margin	Detector	Corr.	Result
Frequeir	Level	i olanzadon		-			
MHz	dBuV/m		dBµV/m	dB		dB/m	
-	dBuV/m	Horizontal		dB 36.78	PK	dB/m 2.5	Pass
MHz	dBuV/m 3 37.22		dBµV/m		PK PK		Pass Pass
MHz 4905.9	dBuV/m 3 37.22 6 35.77	Horizontal	dBμV/m 74.00	36.78		2.5	
MHz 4905.9 4237.9	dBuV/m 3 37.22 6 35.77 1Hz – 1GHz) Emission	Horizontal	dBμV/m 74.00	36.78		2.5	
MHz 4905.9 4237.9 2480MHz (30M	Level dBuV/m 3 37.22 6 35.77 1Hz – 1GHz) Emission	Horizontal Vertical	dBμV/m 74.00 74.00	36.78 38.23	PK	2.5 0.7	Pass
MHz 4905.9 4237.9 2480MHz (30M Frequent	Level dBuV/m 3 37.22 6 35.77 1Hz – 1GHz) cy Emission Level	Horizontal Vertical	dBμV/m 74.00 74.00 Limit	36.78 38.23 Margin	PK Detector QP	2.5 0.7 Corr.	Pass
MHz 4905.9 4237.9 2480MHz (30M Frequenc MHz	dBuV/m 3 37.22 6 35.77 1Hz – 1GHz) cy Emission Level dBuV/m	Horizontal Vertical Polarization	dBμV/m 74.00 74.00 Limit dBμV/m	36.78 38.23 Margin dB	PK Detector	2.5 0.7 Corr. dB	Pass Result
MHz 4905.9 4237.9 2480MHz (30M Frequenc MHz	dBuV/m 3 37.22 6 35.77 1Hz – 1GHz) cy Emission cy Level dBuV/m 	Horizontal Vertical Polarization Horizontal	dBμV/m 74.00 74.00 Limit dBμV/m	36.78 38.23 Margin dB 	PK Detector QP	2.5 0.7 Corr. dB 	Pass Result Pass
MHz 4905.9 4237.9 2480MHz (30M Frequent MHz 	dBuV/m 3 37.22 6 35.77 1Hz – 1GHz) cy Emission Level dBuV/m ove 1GHz) Emission	Horizontal Vertical Polarization Horizontal	dBμV/m 74.00 74.00 Limit dBμV/m	36.78 38.23 Margin dB 	PK Detector QP	2.5 0.7 Corr. dB 	Pass Result Pass
MHz 4905.9 4237.9 2480MHz (30M Frequent MHz 2480MHz (Abo	dBuV/m 3 37.22 6 35.77 1Hz – 1GHz) cy Emission Level dBuV/m ove 1GHz) Emission	Horizontal Vertical Polarization Horizontal Vertical	dBμV/m 74.00 74.00 Limit dBμV/m 	36.78 38.23 Margin dB 	PK Detector QP QP	2.5 0.7 Corr. dB 	Pass Result Pass Pass
MHz 4905.9 4237.9 2480MHz (30M Frequent MHz 2480MHz (Abo Frequent	dBuV/m 3 37.22 6 35.77 1Hz – 1GHz) cy Emission Level dBuV/m ove 1GHz) cy Emission Level dBuV/m	Horizontal Vertical Polarization Horizontal Vertical	dBμV/m 74.00 74.00 Limit dBμV/m 	36.78 38.23 Margin dB Margin	PK Detector QP QP	2.5 0.7 Corr. dB Corr.	Pass Result Pass Pass
MHz 4905.9 4237.9 2480MHz (30M Frequent MHz 2480MHz (Abo Frequent MHz	Level dBuV/m 3 37.22 6 35.77 1Hz – 1GHz) Emission cy Level dBuV/m ove 1GHz) Emission Level dBuV/m acy Emission Level dBuV/m 1 36.27	Horizontal Vertical Polarization Horizontal Vertical Polarization	dBμV/m 74.00 74.00 Limit dBμV/m Limit dBμV/m	36.78 38.23 Margin dB Margin dB	PK Detector QP QP Detector	2.5 0.7 Corr. dB Corr. dB/m	Pass Result Pass Pass Result

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SPTM1 (Version W)

	MHz (30MHz	,						
	Frequency	Emission Level	Polarization	Limit	Margin	Detector	Corr.	Result
	MHz	dBuV/m		dBµV/m	dB		dB	
	103.23	30.13	Horizontal	43.50	13.37	QP	-28.0	Pass
	32.10	24.14	Vertical	40.00	15.86	QP	-25.4	Pass
2402	MHz (Above 1	IGHz)						
	Frequency	Emission Level	Polarization	Limit	Margin	Detector	Corr.	Result
	MHz	dBuV/m		dBµV/m	dB		dB/m	
	7491.09	40.48	Horizontal	74.00	33.52	PK	6.6	Pass
	7027.03	39.24	Vertical	74.00	34.76	PK	6.0	Pass
2440	MHz (30MHz							
	Frequency	Emission Level	Polarization	Limit	Margin	Detector	Corr.	Result
	MHz	dBuV/m		dBµV/m	dB		dB	
			Horizontal			QP		Pass
			Vertical			QP		Pass
2440	MHz (Above 1	IGHz)						
	Frequency	Emission Level	Polarization	Limit	Margin	Detector	Corr.	Result
	MHz	dBuV/m		dBµV/m	dB		dB/m	
	7590.93	40.76	Horizontal	74.00	33.24	PK	6.4	Pass
	7029.37	40.01	Vertical	74.00	33.99	PK	6.1	Pass
2480	2480MHz (30MHz – 1GHz)							
	Frequency	Emission Level	Polarization	Limit	Margin	Detector	Corr.	Result
	MHz	dBuV/m		dBµV/m	dB		dB	
			Horizontal			QP		Pass
			Vertical			QP		Pass
2480MHz (Above 1GHz)								
	Frequency	Emission	Polarization	Limit	Margin	Detector	Corr.	Result
	MHz	Level dBuV/m		dBµV/m	dB		dB/m	
	7069.68	38.32	Horizontal	74.00	35.68	PK	2.5	Pass

Remark:

(1) "*" means the emission(s) appear within the restrict bands shall follow the requirement of section 15.205.

74.00

33.82

0.7

Pass

ΡK

- (2) Data of measurement within this frequency range shown "--" in the table above means the reading of emissions are the noise floor or attenuated more than 10dB below the permissible limits or the field strength is too small to be measured.
- (3) Above 1GHz: Corrector factor = Antenna Factor + Cable Loss- Amplifier Gain.

Vertical

(4) Below 1GHz: Corrector factor = Antenna Factor + Cable Loss.

7038.75

40.18



10 Test Equipment List

Radiated Emission Test

DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL. DUE DATE
EMI Test Receiver	Rohde & Schwarz	ESR 26	101269	2018-7-14
Trilog Super Broadband Test Antenna	Schwarzbeck	VULB 9163	707	2018-7-14
Horn Antenna	Rohde & Schwarz	HF907	102294	2018-7-14
Pre-amplifier	Rohde & Schwarz	SCU 18	102230	2018-7-14
Signal Generator	Rohde & Schwarz	SMY01	839369/005	2018-7-7
Attenuator	Agilent	8491A	MY39264334	2018-7-7
3m Semi-anechoic chamber	TDK	9X6X6		2020-7-7
Test software	Rohde & Schwarz	EMC32	Version 9.15.00	N/A

Conducted Emission Test

DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL. DUE DATE	
EMI Test Receiver	EMI Test Receiver Rohde & Schwarz		101782	2018-7-14	
LISN	Rohde & Schwarz	ENV4200	100249	2018-7-14	
LISN	Rohde & Schwarz	ENV432	101318	2018-7-14	
LISN	Rohde & Schwarz	ENV216	100326	2018-7-14	
ISN	Rohde & Schwarz	ENY81	100177	2018-7-14	
ISN	Rohde & Schwarz	ENY81-CA6	101664	2018-7-14	
High Voltage Probe	Rohde & Schwarz	TK9420(VT94 20)	9420-584	2018-7-14	
RF Current Probe	Rohde & Schwarz	EZ-17	100816	2018-7-14	
Attenuator	Shanghai Huaxiang	TS2-26-3	080928189	2018-7-7	
Test software Rohde & Schwarz		EMC32	Version9.15.00	N/A	

TS8997 Test System

DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL. DUE DATE	
Signal Generator	Rohde & Schwarz	SMB100A	108272	2018-7-7	
Vector Signal Generator	Rohde & Schwarz	SMBV100A	262825	2018-7-23	
Communication Synthetical Test Instrument		CMW 270	101251	2019-2-15	
Signal Analyzer	Rohde & Schwarz	FSV40	101030	2018-7-7	
Vector Signal Generator	Rohde & Schwarz	SMU 200A	105324	2018-7-7	
RF Switch Module	Rohde & Schwarz	OSP120/OSP-B157	101226/100851	2018-7-7	
Power Splitter	Weinschel	1580	SC319	2018-7-7	
10dB Attenuator	Weinschel	56-10	58764	2018-7-14	
10dB Attenuator	R&S	DNF	DNF-001	2018-7-14	
10dB Attenuator	R&S	DNF	DNF-002	2018-7-14	
10dB Attenuator	R&S	DNF	DNF-003	2018-7-14	
10dB Attenuator	R&S	DNF	DNF-004	2018-7-14	
Test software	Rohde & Schwarz	EMC32	Version 10.38.00	N/A	
Test software Tonscend		System for BT/WIFI	Version 2.6	N/A	



11 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				
Items	Extended Uncertainty			
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 RF test with TS 8997	Power level test involved: 2.13dB Frequency test involved: 0.6×10 ⁻⁷			
Uncertainty for Conducted Emission 150kHz-30MHz (for test using AMN ENV432 or ENV4200)	3.21dB			