错误！未指定书签。 26DB & 99% EMISSION BANDWIDTH

错误！未指定书签。 Applied procedures / limit

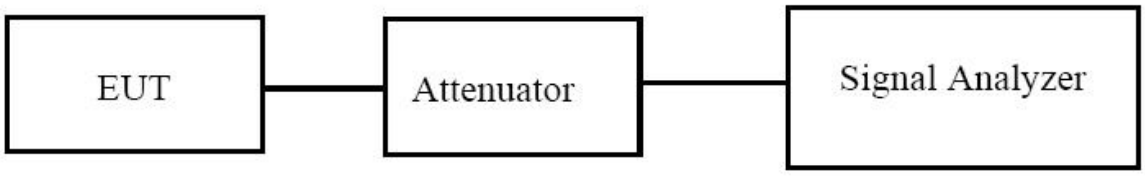
The maximum power spectral density is measured as a conducted emission by direct connection of a calibrated test instrument to the equipment under test. If the device cannot be connected directly, alternative techniques acceptable to the Commission may be used. Measurements in the 5.725-5.85 GHz band are made over a reference bandwidth of 500 kHz or the 26 dB emission bandwidth of the device, whichever is less. Measurements in the 5.15-5.25 GHz, 5.25-5.35 GHz, and the 5.47-5.725 GHz bands are made over a bandwidth of 1 MHz or the 26 dB emission bandwidth of the device, whichever is less. A narrower resolution bandwidth can be used, provided that the measured power is integrated over the full reference bandwidth.

错误！未指定书签。 TEST PROCEDURE

a) Set RBW = approximately 1% of the emission bandwidth.
b) Set the VBW > RBW.
c) Detector = Peak.
d) Trace mode = max hold.
e) Measure the maximum width of the emission that is 26 dB down from the maximum of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

The following procedure shall be used for measuring (99 %) power bandwidth:

1. Set center frequency to the nominal EUT channel center frequency.
2. Set span = 1.5 times to 5.0 times the OBW.
3. Set RBW = 1 % to 5 % of the OBW
4. Set VBW ≥ 3 · RBW
5. Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used.
6. Use the 99 % power bandwidth function of the instrument (if available).
7. If the instrument does not have a 99 % power bandwidth function, the trace data points are recovered and directly summed in power units. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5 % of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5 % of the total is reached; that frequency is recorded as the upper frequency. The 99% occupied bandwidth is the difference between these two frequencies.



错误！未指定书签。 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

错误！未指定书签。 TEST RESULTS

EUT：	5G Smart Phone	Model Name. ：	GQ5002
Temperature：	25 ℃	Relative Humidity：	56%
Pressure：	1012 hPa	Test Voltage ：	DC 3.85V
Test Mode ：	TX Frequency Band I (5150-5250MHz), Band IV (5725-5850MHz)		

Test data reference attachment.

错误！未指定书签。 **MINIMUM 6 DB BANDWIDTH**

错误！未指定书签。 **Applied procedures / limit**

According to FCC §15.407(e)
(e) Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

错误！未指定书签。 **TEST PROCEDURE**

Section 15.407(e) specifies the minimum 6 dB emission bandwidth of at least 500 KHz for the band 5.715-5.85 GHz. The following procedure shall be used for measuring this bandwidth:

a) Set RBW = 100 kHz.

b) Set the video bandwidth (VBW) ≥ 3 × RBW.

c) Detector = Peak.

d) Trace mode = max hold.

e) Sweep = auto couple.

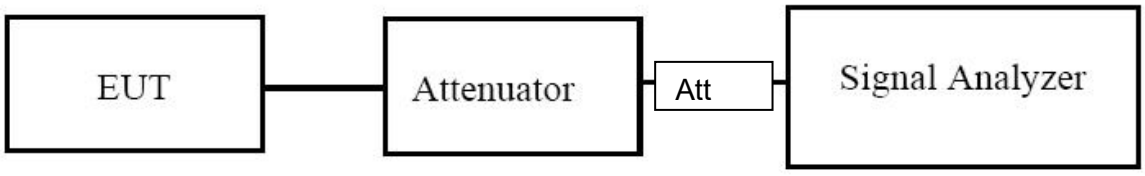
f) Allow the trace to stabilize.

g) 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.

错误！未指定书签。 **DEVIATION FROM STANDARD**

No deviation.

错误！未指定书签。 **TEST SETUP**



错误！未指定书签。 **EUT OPERATION CONDITIONS**

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

错误！未指定书签。 TEST RESULTS

EUT：	5G Smart Phone	Model Name. ：	GQ5002
Temperature：	25 ℃	Relative Humidity：	60%
Pressure：	1012 hPa	Test Voltage ：	DC 3.85V
Test Mode ：	TX (5G) Mode Frequency Band IV (5725-5850MHz)		

Test data reference attachment.

错误！未指定书签。 MAXIMUM CONDUCTED OUTPUT POWER

错误！未指定书签。 PPLIED PROCEDURES / LIMIT

According to FCC §15.407

The maximum conduced output power should not exceed:

Frequency Band(MHz)	Limit
5150~5250	250mW
5725~5850	1W

错误！未指定书签。 TEST PROCEDURE

· Maximum conducted output power may be measured using a spectrum analyzer/EMI receiver or an RF power meter.

1. Device Configuration

If possible, configure or modify the operation of the EUT so that it transmits continuously at its maximum power control level (see section II.B.).

a) The intent is to test at 100 percent duty cycle; however a small reduction in duty cycle (to no lower than 98 percent) is permitted if required by the EUT for amplitude control purposes. Manufacturers are expected to provide software to the test lab to permit such continuous operation.

b) If continuous transmission (or at least 98 percent duty cycle) cannot be achieved due to hardware limitations (e.g., overheating), the EUT shall be operated at its maximum power control level with the transmit duration as long as possible and the duty cycle as high as possible.

2. Measurement using a Spectrum Analyzer or EMI Receiver (SA)

Measurement of maximum conducted output power using a spectrum analyzer requires integrating the spectrum across a frequency span that encompasses, at a minimum, either the EBW or the 99-percent occupied bandwidth of the signal.1 However, the EBW must be used to determine bandwidth dependent limits on maximum conducted output power in accordance with § 15.407(a).

a) The test method shall be selected as follows: (i) Method SA-1 or SA-1 Alternative (averaging with the EUT transmitting at full power throughout each sweep) shall be applied if either of the following conditions can be satisfied:

• The EUT transmits continuously (or with a duty cycle ≥ 98 percent).

• Sweep triggering or gating can be implemented in a way that the device transmits at the maximum power control level throughout the duration of each of the instrument sweeps to be averaged. This condition can generally be achieved by triggering the instrument's sweep if the duration of the sweep (with the analyzer configured as in Method SA-1, below) is equal to or shorter than the duration T of each transmission from the EUT and if those transmissions exhibit full power throughout their durations.

(ii) Method SA-2 or SA-2 Alternative (averaging across on and off times of the EUT transmissions, followed by duty cycle correction) shall be applied if the conditions of (i) cannot be achieved and the transmissions exhibit a constant duty cycle during the measurement duration. Duty cycle will be considered to be constant if variations are less than ± 2 percent.

(iii) Method SA-3 (RMS detection with max hold) or SA-3 Alternative (reduced VBW with max hold) shall be applied if the conditions of (i) and (ii) cannot be achieved.

b) Method SA-1 (trace averaging with the EUT transmitting at full power throughout each sweep): (i) Set span to encompass the entire emission bandwidth (EBW) (or, alternatively, the entire 99% occupied bandwidth) of the signal.

(ii) Set RBW = 1 MHz.

(iii) Set VBW ≥ 3 MHz.

(iv) Number of points in sweep ≥ 2 Span / RBW. (This ensures that bin-to-bin spacing is ≤ RBW/2, so that narrowband signals are not lost between frequency bins.)

(v) Sweep time = auto.

(vi) Detector = RMS (i.e., power averaging), if available. Otherwise, use sample detector mode.

(vii) If transmit duty cycle < 98 percent, use a video trigger with the trigger level set to enable triggering only on full power pulses. Transmitter must operate at maximum power control level for the entire duration of every sweep. If the EUT transmits continuously (i.e., with no off intervals) or at duty cycle ≥ 98 percent, and if each transmission is entirely at the maximum power control level, then the trigger shall be set to "free run".

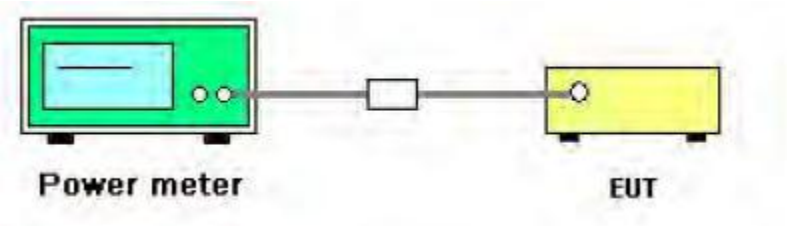
(viii) Trace average at least 100 traces in power averaging (i.e., RMS) mode.

(ix) Compute power by integrating the spectrum across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal using the instrument's band power measurement function with band limits set equal to the EBW (or occupied bandwidth) band edges. If the instrument does not have a band power function, sum the spectrum

错误！未指定书签。 **DEVIATION FROM STANDARD**

No deviation.

错误！未指定书签。 **TEST SETUP**



错误！未指定书签。 **EUT OPERATION CONDITIONS**

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

错误！未指定书签。 TEST RESULTS

EUT：	5G Smart Phone	Model Name. ：	GQ5002
Temperature：	25 ℃	Relative Humidity：	60%
Pressure：	1012 hPa	Test Voltage ：	DC 3.85V
Test Mode ：	TX (5G) Mode Frequency Band I (5150-5250MHz), Band IV (5725-5850MHz)		

Test data reference attachment.

错误！未指定书签。 **OUT OF BAND EMISSIONS**

错误！未指定书签。 **Applicable Standard**

According to FCC §15.407(b)

Undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

(1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

(2) For transmitters operating in the 5.725-5.85 GHz band: All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

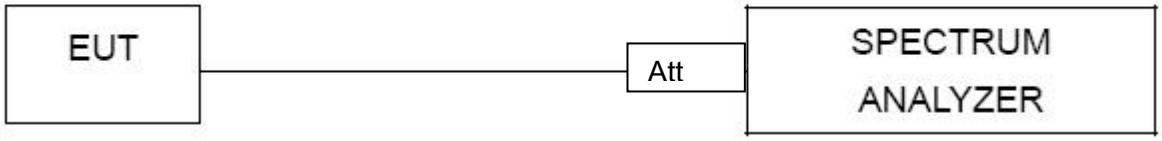
错误！未指定书签。 **Test Procedure**

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 its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set RBW of spectrum analyzer to 1 MHz with a convenient frequency span.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

错误！未指定书签。 **DEVIATION FROM STANDARD**

No deviation.

错误！未指定书签。 **TEST SETUP**



错误！未指定书签。 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

错误！未指定书签。 TEST RESULTS

EUT：	5G Smart Phone	Model Name. ：	GQ5002
Temperature：	25 ℃	Relative Humidity：	56%
Pressure：	1012 hPa	Test Voltage ：	DC 3.85V

Test data reference attachment.

3.8 SPURIOUS RF CONDUCTED EMISSIONS

3.8.1Conformance Limit

According to FCC §15.407(b)(1) (2) (3) (4)

3.8.2Measuring Instruments

The Measuring equipment is listed in the section 6.3 of this test report.

3.8.3Test Setup

Please refer to Section 6.1 of this test report.

3.8.4Test Procedure

The Spurious RF conducted emissions compliance of RF radiated emission should be measured by following the guidance in ANSI C63.10-2013 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization etc. Set RBW=100kHz and VBW= 300KHz to measure the peak field strength , and measure frequency range from 30MHz to 40GHz.

3.8.5Test Results

Remark: The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the spurious emissions and bandege measurement data.

Test data reference attachment.

3.9 FREQUENCY STABILITY MEASUREMENT

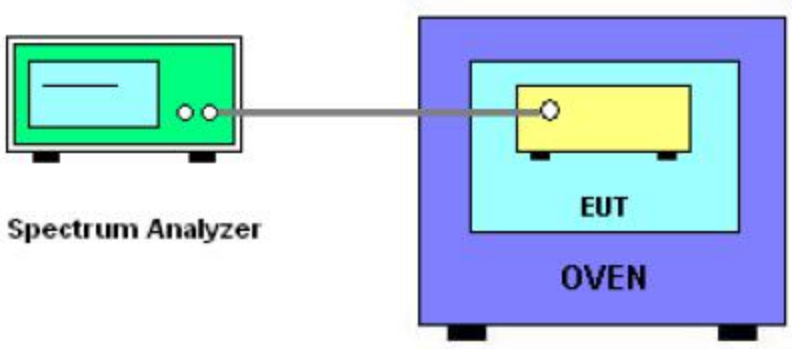
3.9.1 LIMIT

Manufactures of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

3.9.2 TEST PROCEDURES

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. EUT have transmitted absence of modulation signal and fixed channelize.
3. Set the spectrum analyzer span to view the entire absence of modulation emissions bandwidth.
4. Set RBW = 10 kHz, VBW = 10 kHz with peak detector and maxhold settings.
5. fc is declaring of channel frequency. Then the frequency error formula is (fc-f)/fc × 10_6 ppm .
6. The test extreme voltage is to change the primary supply voltage from 85 to 115 percent of the nominal value
7. Extreme temperature is -20°C~70°C.

3.9.3 TEST SETUP LAYOUT



3.9.4 EUT OPERATION DURING TEST

The EUT was programmed to be in continuously un-modulation transmitting mode.

3.9.5 TEST RESULTS

EUT：	5G Smart Phone	Model Name. ：	GQ5002
Temperature：	25 ℃	Relative Humidity：	56%
Pressure：	1012 hPa	Test Voltage ：	DC 3.85V
Test Mode ：	TX Frequency Band I (5150-5250MHz)		

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5180MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	3.85	5180.0137	5180	0.0137	-2.6448
		V max (V)	4.2	5180.0287	5180	0.0287	-5.5405
		V min (V)	3.4	5180.0042	5180	0.0042	-0.8108
Limits				Within 5150-5250MHz			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5180MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	3.85	T (°C)	-20	5180.0230	5180	0.0230	-4.4402
		T (°C)	-10	5180.0015	5180	0.0015	-0.2896
		T (°C)	0	5180.0137	5180	0.0137	-2.6448
		T (°C)	10	5180.0155	5180	0.0155	-2.9923
		T (°C)	20	5180.0262	5180	0.0262	-5.0579
		T (°C)	30	5180.0177	5180	0.0177	-3.4170
		T (°C)	40	5180.0131	5180	0.0131	-2.5290
		T (°C)	50	5180.0011	5180	0.0011	-0.2124
		T (°C)	60	5180.0268	5180	0.0268	-5.1737
		T (°C)	70	5180.0197	5180	0.0197	-3.8031
Limits				Within 5150-5250MHz			
Result				Complies			

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5200MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	3.85	5200.0244	5200	0.0244	-4.6923
		V max (V)	4.2	5200.0033	5200	0.0033	-0.6346
		V min (V)	3.4	5200.0019	5200	0.0019	-0.3654
Limits				Within 5150-5250MHz			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5200MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	3.85	T (°C)	-20	5200.0324	5200	0.0324	-6.2308
		T (°C)	-10	5200.0213	5200	0.0213	-4.0962
		T (°C)	0	5200.0264	5200	0.0264	-5.0769
		T (°C)	10	5200.0248	5200	0.0248	-4.7692
		T (°C)	20	5200.0309	5200	0.0309	-5.9423
		T (°C)	30	5200.0093	5200	0.0093	-1.7885
		T (°C)	40	5200.0245	5200	0.0245	-4.7115
		T (°C)	50	5200.0305	5200	0.0305	-5.8654
		T (°C)	60	5200.0106	5200	0.0106	-2.0385
		T (°C)	70	5200.0288	5200	0.0288	-5.5385
Limits				Within 5150-5250MHz			
Result				Complies			

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5240MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	3.85	5240.0105	5240	0.0105	-2.0038
		V max (V)	4.2	5240.0338	5240	0.0338	-6.4504
		V min (V)	3.4	5240.0031	5240	0.0031	-0.5916
Limits				Within 5150-5250MHz			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5240MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	3.85	T (°C)	-20	5240.0133	5240	0.0133	-2.5382
		T (°C)	-10	5240.0305	5240	0.0305	-5.8206
		T (°C)	0	5240.0162	5240	0.0162	-3.0916
		T (°C)	10	5240.0005	5240	0.0005	-0.0954
		T (°C)	20	5240.0340	5240	0.0340	-6.4885
		T (°C)	30	5240.0040	5240	0.0040	-0.7634
		T (°C)	40	5240.0160	5240	0.0160	-3.0534
		T (°C)	50	5240.0126	5240	0.0126	-2.4046
		T (°C)	60	5240.0112	5240	0.0112	-2.1374
		T (°C)	70	5240.0043	5240	0.0043	-0.8206
Limits				Within 5150-5250MHz			
Result				Complies			

EUT：	5G Smart Phone	Model Name. ：	GQ5002
Temperature：	25 ℃	Relative Humidity：	56%
Pressure：	1012 hPa	Test Voltage ：	DC 3.85V
Test Mode ：	TX Frequency(5745-5825MHz)		

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5745MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	3.85	5745.0319	5745	0.03190	-5.5527
		V max (V)	4.2	5745.0064	5745	0.00640	-1.1140
		V min (V)	3.4	5745.008	5745	0.00800	-1.3925
Limits				Within 5745-5850MHz			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5745MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	3.85	T (°C)	-20	5745.0057	5745	0.00570	-0.9922
		T (°C)	-10	5745.0051	5745	0.00510	-0.8877
		T (°C)	0	5745.0312	5745	0.03120	-5.4308
		T (°C)	10	5745.0285	5745	0.02850	-4.9608
		T (°C)	20	5745.0147	5745	0.01470	-2.5587
		T (°C)	30	5745.0295	5745	0.02950	-5.1349
		T (°C)	40	5745.0276	5745	0.02760	-4.8042
		T (°C)	50	5745.0209	5745	0.02090	-3.6379
		T (°C)	60	5745.0287	5745	0.02870	-4.9956
		T (°C)	70	5745.0116	5745	0.01160	-2.0191
Limits				Within 5745-5850MHz			
Result				Complies			

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5785MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	3.85	5785.0028	5785	0.00280	-0.4840
		V max (V)	4.2	5785.0019	5785	0.00190	-0.3284
		V min (V)	3.4	5785.0094	5785	0.00940	-1.6249
Limits				Within 5745-5850MHz			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5785MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	3.85	T (°C)	-20	5785.0181	5785	0.01810	-3.1288
		T (°C)	-10	5785.0110	5785	0.01100	-1.9015
		T (°C)	0	5785.0328	5785	0.03280	-5.6698
		T (°C)	10	5785.0120	5785	0.01200	-2.0743
		T (°C)	20	5785.0154	5785	0.01540	-2.6621
		T (°C)	30	5785.0326	5785	0.03260	-5.6353
		T (°C)	40	5785.0238	5785	0.02380	-4.1141
		T (°C)	50	5785.0062	5785	0.00620	-1.0717
		T (°C)	60	5785.0094	5785	0.00940	-1.6249
		T (°C)	70	5785.0202	5785	0.02020	-3.4918
Limits				Within 5745-5850MHz			
Result				Complies			

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5825MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	3.85	5825.0073	5825	0.00730	-1.2532
		V max (V)	4.2	5825.0254	5825	0.02540	-4.3605
		V min (V)	3.4	5825.0106	5825	0.01060	-1.8197
Limits				Within 5745-5850MHz			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5825MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	3.85	T (°C)	-20	5825.0111	5825	0.01110	-1.9056
		T (°C)	-10	5825.0146	5825	0.01460	-2.5064
		T (°C)	0	5825.0172	5825	0.01720	-2.9528
		T (°C)	10	5825.0122	5825	0.01220	-2.0944
		T (°C)	20	5825.0074	5825	0.00740	-1.2704
		T (°C)	30	5825.0202	5825	0.02020	-3.4678
		T (°C)	40	5825.0033	5825	0.00330	-0.5665
		T (°C)	50	5825.0331	5825	0.03310	-5.6824
		T (°C)	60	5825.0101	5825	0.01010	-1.7339
		T (°C)	70	5825.0172	5825	0.01720	-2.9528
Limits				Within 5745-5850MHz			
Result				Complies			

4. ANTENNA REQUIREMENT

4.1 STANDARD REQUIREMENT

15.203 requirement: For intentional device, according to 15.203: 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.

4.2 EUT ANTENNA

The EUT antenna is permanent attached PIFA antenna (antenna gain: -1.0dBi). It comply with the standard requirement.

5. TEST RESULTS

5.2G

5.1 DUTY CYCLE

Condition	Mode	Frequency (MHz)	Duty Cycle (%)	Correction Factor (dB)
NVNT	802.11a	5180	98.2	0.08
NVNT	802.11a	5200	98.18	0.08
NVNT	802.11a	5240	98.18	0.08
NVNT	802.11ac20	5180	98.1	0.08
NVNT	802.11ac20	5200	98.07	0.08
NVNT	802.11ac20	5240	98.08	0.08
NVNT	802.11ac40	5190	96.33	0.16
NVNT	802.11ac40	5230	96.38	0.16
NVNT	802.11ac80	5210	93.17	0.31
NVNT	802.11n(HT20)	5180	98.06	0.09
NVNT	802.11n(HT20)	5200	98.06	0.09
NVNT	802.11n(HT20)	5240	98.06	0.09
NVNT	802.11n(HT40)	5190	96.34	0.16
NVNT	802.11n(HT40)	5230	96.35	0.16

Duty Cycle NVNT 802.11a 5180MHz