

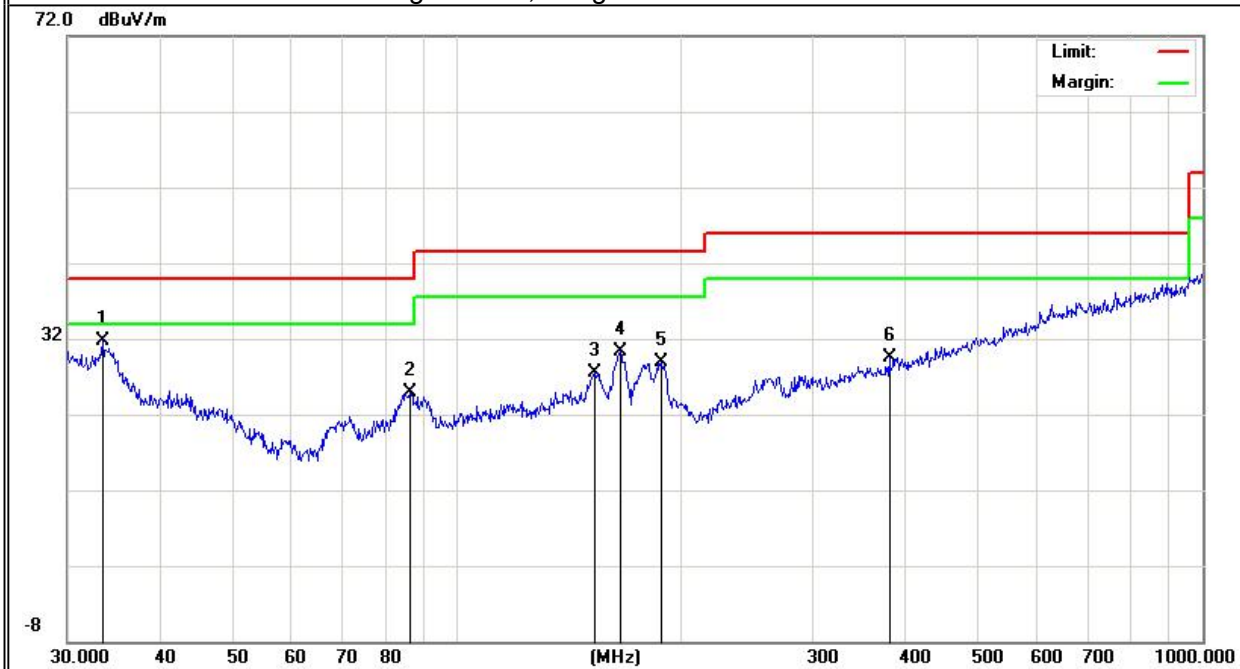
- Spurious Emission below 1GHz (30MHz to 1GHz)
All the modulation modes have been tested, and the worst result was report as below:

EUT:	5G Smart Phone	Model Name :	GQ5002
Temperature:	25 °C	Relative Humidity:	55%
Pressure:	1010hPa	Test Mode:	Normal Link
Test Voltage :	DC 3.85V		

Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Remark
	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
V	33.4449	9.26	22.37	31.63	40.00	-8.37	QP
V	86.5029	9.72	15.17	24.89	40.00	-15.11	QP
V	153.2004	9.29	18.23	27.52	43.50	-15.98	QP
V	165.4866	12.89	17.43	30.32	43.50	-13.18	QP
V	187.7529	12.97	16.03	29.00	43.50	-14.50	QP
V	379.9141	6.04	23.42	29.46	46.00	-16.54	QP

Remark:

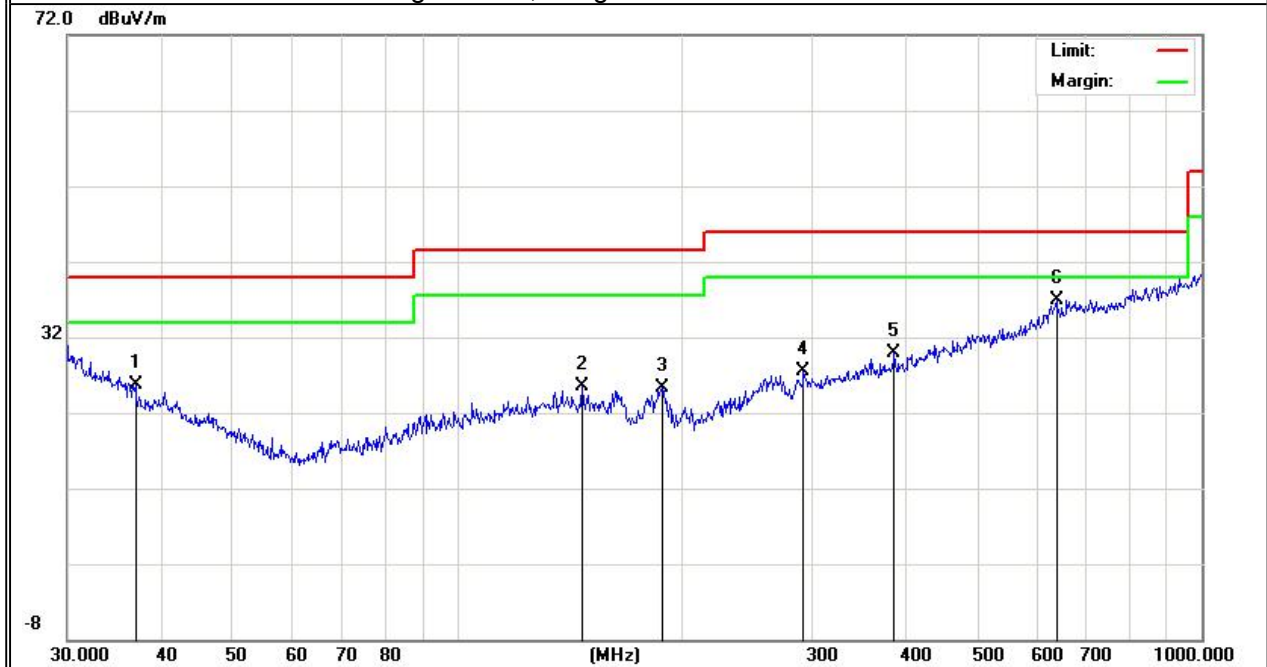
Emission Level = Meter Reading+ Factor, Margin= Emission Level- Limit



Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Remark
	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
H	37.0248	5.74	19.88	25.62	40.00	-14.38	QP
H	147.4036	7.06	18.42	25.48	43.50	-18.02	QP
H	189.0741	9.39	15.97	25.36	43.50	-18.14	QP
H	292.0582	6.52	20.90	27.42	46.00	-18.58	QP
H	386.6338	6.21	23.70	29.91	46.00	-16.09	QP
H	638.3686	7.78	29.19	36.97	46.00	-9.03	QP

Remark:

Emission Level = Meter Reading+ Factor, Margin= Emission Level- Limit



Spurious Emission Above 1GHz (1GHz to 25GHz)

EUT:	5G Smart Phone	Model No.:	GQ5002
Temperature:	20 °C	Relative Humidity:	48%
Test Mode:	802.11b/g/n(HT20, HT40)	Test By:	Mukzi Lee

All the modulation modes have been tested, and the worst result was report as below:

Frequency	Read Level	Cable loss	Antenna Factor	Preamp Factor	Emission Level	Limits	Margin	Remark	Comment
(MHz)	(dBμV)	(dB)	dB/m	(dB)	(dBμV/m)	(dBμV/m)	(dB)		
Low Channel (2412 MHz)(802.11b)--Above 1G									
4824.069	64.82	5.21	35.59	44.30	61.32	74.00	-12.68	Pk	Vertical
4824.069	43.74	5.21	35.59	44.30	40.24	54.00	-13.76	AV	Vertical
7236.154	65.21	6.48	36.27	44.60	63.36	74.00	-10.64	Pk	Vertical
7236.154	50.65	6.48	36.27	44.60	48.80	54.00	-5.20	AV	Vertical
4824.103	70.27	5.21	35.55	44.30	66.73	74.00	-7.27	Pk	Horizontal
4824.103	48.48	5.21	35.55	44.30	44.94	54.00	-9.06	AV	Horizontal
7236.146	65.95	6.48	36.27	44.52	64.18	74.00	-9.82	Pk	Horizontal
7236.146	44.23	6.48	36.27	44.52	42.46	54.00	-11.54	AV	Horizontal
Middle Channel (2437 MHz)(802.11b)--Above 1G									
4874.135	63.37	5.21	35.66	44.20	60.04	74.00	-13.96	Pk	Vertical
4874.135	46.23	5.21	35.66	44.20	42.90	54.00	-11.10	AV	Vertical
7311.271	63.69	7.10	36.50	44.43	62.86	74.00	-11.14	Pk	Vertical
7311.271	46.33	7.10	36.50	44.43	45.50	54.00	-8.50	AV	Vertical
4874.089	65.66	5.21	35.66	44.20	62.33	74.00	-11.67	Pk	Horizontal
4874.089	48.25	5.21	35.66	44.20	44.92	54.00	-9.08	AV	Horizontal
7311.192	66.73	7.10	36.50	44.43	65.90	74.00	-8.10	Pk	Horizontal
7311.192	45.22	7.10	36.50	44.43	44.39	54.00	-9.61	AV	Horizontal
High Channel (2462 MHz)(802.11b)--Above 1G									
4924.055	64.88	5.21	35.52	44.21	61.40	74.00	-12.60	Pk	Vertical
4924.055	46.09	5.21	35.52	44.21	42.61	54.00	-11.39	AV	Vertical
7386.215	65.12	7.10	36.53	44.60	64.15	74.00	-9.85	Pk	Vertical
7386.215	47.19	7.10	36.53	44.60	46.22	54.00	-7.78	AV	Vertical
4924.183	64.19	5.21	35.52	44.21	60.71	74.00	-13.29	Pk	Horizontal
4924.183	46.47	5.21	35.52	44.21	42.99	54.00	-11.01	AV	Horizontal
7386.144	67.70	7.10	36.53	44.60	66.73	74.00	-7.27	Pk	Horizontal
7386.144	47.58	7.10	36.53	44.60	46.61	54.00	-7.39	AV	Horizontal

Note:

- (1) Emission Level= Antenna Factor + Cable Loss + Read Level - Preamp Factor
- (2) Other emissions are attenuated more than 20dB below the permissible limits, so it does not recorded in the report.
- (3)"802.11b" mode is the worst mode. When PK value is lower than the Average value limit, average don't record.

■ Spurious Emission in Restricted Band 2310MHz -18000MHz

All the modulation modes have been tested, and the worst result was report as below:

Frequency	Meter Reading	Cable Loss	Antenna Factor	Preamplifier Factor	Emission Level	Limits	Margin	Detector	Comment
(MHz)	(dBμV)	(dB)	(dB/m)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	Type	
802.11b									
2310.00	68.40	2.97	27.21	43.80	54.78	74	-19.22	Pk	Horizontal
2310.00	45.61	2.97	27.21	43.80	31.99	54	-22.01	AV	Horizontal
2310.00	68.64	2.97	27.21	43.80	55.02	74	-18.98	Pk	Vertical
2310.00	51.24	2.97	27.21	43.80	37.62	54	-16.38	AV	Vertical
2390.00	68.31	3.14	27.33	43.80	54.98	74	-19.02	Pk	Vertical
2390.00	50.24	3.14	27.33	43.80	36.91	54	-17.09	AV	Vertical
2390.00	69.37	3.14	27.33	43.80	56.04	74	-17.96	Pk	Horizontal
2390.00	51.66	3.14	27.33	43.80	38.33	54	-15.67	AV	Horizontal
2483.50	71.50	3.58	27.70	44.00	58.78	74	-15.22	Pk	Vertical
2483.50	47.19	3.58	27.70	44.00	34.47	54	-19.53	AV	Vertical
2483.50	72.78	3.58	27.70	44.00	60.06	74	-13.94	Pk	Horizontal
2483.50	51.06	3.58	27.70	44.00	38.34	54	-15.66	AV	Horizontal
802.11g									
2310.00	71.41	2.97	27.21	43.80	57.79	74	-16.21	Pk	Horizontal
2310.00	47.34	2.97	27.21	43.80	33.72	54	-20.28	AV	Horizontal
2310.00	72.23	2.97	27.21	43.80	58.61	74	-15.39	Pk	Vertical
2310.00	51.33	2.97	27.21	43.80	37.71	54	-16.29	AV	Vertical
2390.00	71.78	3.14	27.33	43.80	58.45	74	-15.55	Pk	Vertical
2390.00	50.62	3.14	27.33	43.80	37.29	54	-16.71	AV	Vertical
2390.00	70.36	3.14	27.33	43.80	57.03	74	-16.97	Pk	Horizontal
2390.00	50.28	3.14	27.33	43.80	36.95	54	-17.05	AV	Horizontal
2483.50	71.04	3.58	27.70	44.00	58.32	74	-15.68	Pk	Vertical
2483.50	49.36	3.58	27.70	44.00	36.64	54	-17.36	AV	Vertical
2483.50	69.97	3.58	27.70	44.00	57.25	74	-16.75	Pk	Horizontal
2483.50	50.45	3.58	27.70	44.00	37.73	54	-16.27	AV	Horizontal
802.11n20									
2310.00	70.25	2.97	27.21	43.80	56.63	74	-17.37	Pk	Horizontal
2310.00	52.87	2.97	27.21	43.80	39.25	54	-14.75	AV	Horizontal
2310.00	68.43	2.97	27.21	43.80	54.81	74	-19.19	Pk	Vertical
2310.00	49.06	2.97	27.21	43.80	35.44	54	-18.56	AV	Vertical
2390.00	67.31	3.14	27.33	43.80	53.98	74	-20.02	Pk	Vertical
2390.00	48.44	3.14	27.33	43.80	35.11	54	-18.89	AV	Vertical
2390.00	63.88	3.14	27.33	43.80	50.55	74	-23.45	Pk	Horizontal
2390.00	47.01	3.14	27.33	43.80	33.68	54	-20.32	AV	Horizontal
2483.50	69.62	3.58	27.70	44.00	56.90	74	-17.10	Pk	Vertical
2483.50	49.21	3.58	27.70	44.00	36.49	54	-17.51	AV	Vertical
2483.50	66.18	3.58	27.70	44.00	53.46	74	-20.54	Pk	Horizontal
2483.50	46.15	3.58	27.70	44.00	33.43	54	-20.57	AV	Horizontal

802.11n40									
2310.00	70.91	2.97	27.21	43.80	57.29	74	-16.71	Pk	Horizontal
2310.00	54.81	2.97	27.21	43.80	41.19	54	-12.81	AV	Horizontal
2310.00	69.68	2.97	27.21	43.80	56.06	74	-17.94	Pk	Vertical
2310.00	57.97	2.97	27.21	43.80	44.35	54	-9.65	AV	Vertical
2390.00	68.50	3.14	27.33	43.80	55.17	74	-18.83	Pk	Vertical
2390.00	47.27	3.14	27.33	43.80	33.94	54	-20.06	AV	Vertical
2390.00	70.19	3.14	27.33	43.80	56.86	74	-17.14	Pk	Horizontal
2390.00	49.45	3.14	27.33	43.80	36.12	54	-17.88	AV	Horizontal
2483.50	71.59	3.58	27.70	44.00	58.87	74	-15.13	Pk	Vertical
2483.50	50.27	3.58	27.70	44.00	37.55	54	-16.45	AV	Vertical
2483.50	69.41	3.58	27.70	44.00	56.69	74	-17.31	Pk	Horizontal
2483.50	48.63	3.58	27.70	44.00	35.91	54	-18.09	AV	Horizontal

Spurious Emission in Restricted Bands 3260MHz- 18000MHz

All the modulation modes have been tested, the worst result was report as below:

Frequency	Reading Level	Cable Loss	Antenna Factor	Preamp Factor	Emission Level	Limits	Margin	Detector	Comment
(MHz)	(dBμV)	(dB)	dB/m	(dB)	(dBμV/m)	(dBμV/m)	(dB)	Type	
3260	63.02	4.04	29.57	44.70	51.93	74	-22.07	Pk	Vertical
3260	52.02	4.04	29.57	44.70	40.93	54	-13.07	AV	Vertical
3260	69.73	4.04	29.57	44.70	58.64	74	-15.36	Pk	Horizontal
3260	49.26	4.04	29.57	44.70	38.17	54	-15.83	AV	Horizontal
3332	64.30	4.26	29.87	44.40	54.03	74	-19.97	Pk	Vertical
3332	47.28	4.26	29.87	44.40	37.01	54	-16.99	AV	Vertical
3332	67.78	4.26	29.87	44.40	57.51	74	-16.49	Pk	Horizontal
3332	48.37	4.26	29.87	44.40	38.10	54	-15.90	AV	Horizontal
17797	51.09	10.99	43.95	43.50	62.53	74	-11.47	Pk	Vertical
17797	36.82	10.99	43.95	43.50	48.26	54	-5.74	AV	Vertical
17788	47.08	11.81	43.69	44.60	57.98	74	-16.02	Pk	Horizontal
17788	36.48	11.81	43.69	44.60	47.38	54	-6.62	AV	Horizontal

"802.11b" mode is the worst mode. When PK value is lower than the Average value limit, average don't record.

Other emissions are attenuated more than 20dB below the permissible limits, so it does not recorded in the report.

7.3 6DB BANDWIDTH

7.3.1 Applicable Standard

According to FCC Part 15.247(a)(2) and KDB 558074 D01 15.247 Meas Guidance v05r02 Section 8.2.

7.3.2 Conformance Limit

The minimum permissible 6dB bandwidth is 500 kHz.

7.3.3 Measuring Instruments

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

7.3.4 Test Setup

Please refer to Section 6.1 of this test report.

7.3.5 Test Procedure

The testing follows Subclause 11.8 of ANSI C63.10.

The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator.

The path loss was compensated to the results for each measurement.

Set to the maximum power setting and enable the EUT transmit continuously.

The EUT was operating in controlled its channel.

Use the following spectrum analyzer settings:

Span = the frequency band of operation

RBW = 100KHz

VBW $\geq 3 \times$ RBW

Sweep = auto

Detector function = peak

Trace = max hold

7.3.6 Test Results

EUT:	5G Smart Phone	Model No.:	GQ5002
Temperature:	20 °C	Relative Humidity:	48%
Test Mode:	802.11b/g/n20/n40	Test By:	Mukzi Lee

Test data reference attachment.

7.4 DUTY CYCLE

7.4.1 Applicable Standard

According to KDB 558074 D01 15.247 Meas Guidance v05r02 Section 6.

7.4.2 Conformance Limit

No limit requirement.

7.4.3 Measuring Instruments

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

7.4.4 Test Setup

Please refer to Section 6.1 of this test report.

7.4.5 Test Procedure

- a) A diode detector and an oscilloscope that together have a sufficiently short response time to permit accurate measurements of the ON and OFF times of the transmitted signal.
b) The zero-span mode on a spectrum analyzer or EMI receiver if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the ON and OFF times of the transmitted signal:

- 1) Set the center frequency of the instrument to the center frequency of the transmission.
- 2) Set RBW $\geq$ OBW if possible; otherwise, set RBW to the largest available value.
- 3) Set VBW $\geq$ RBW. Set detector = peak or average.
- 4) The zero-span measurement method shall not be used unless both RBW and VBW are $> 50/T$ and the number of sweep points across duration T exceeds 100. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring the duty cycle shall not be used if $T \leq 16.7 \mu s$.)

Measure T_{total} and T_{on}

Calculate Duty Cycle = T_{on} / T_{total}

7.4.6 Test Results

EUT:	5G Smart Phone	Model No.:	GQ5002
Temperature:	20 °C	Relative Humidity:	48%
Test Mode:	802.11b/g/n20/n40	Test By:	Mukzi Lee

Test data reference attachment.

7.5 MAXIMUM OUTPUT POWER

7.5.1 Applicable Standard

According to FCC Part 15.247(b)(3) and KDB 558074 D01 15.247 Meas Guidance v05r02 Section 8.3.2.3.

7.5.2 Conformance Limit

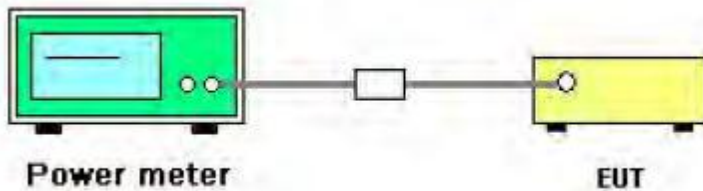
The maximum peak conducted output power of the intentional radiator for systems using digital modulation in the 2400 - 2483.5 MHz bands shall not exceed: 1 Watt (30dBm). If transmitting antenna of directional gain greater than 6dBi is used, the peak output power from the intentional radiator shall be reduced below the above stated value by the amount in dB that the directional gain of the antenna exceeds 6 dBi. In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi.

7.5.3 Measuring Instruments

The following table is the setting of the power meter.

Power meter parameter	Setting
Detector	PK

7.5.4 Test Setup



7.5.5 Test Procedure

The testing follows Measurement Procedure Subclause 11.9.1.3 of ANSI C63.10

7.5.6 EUT operation during Test

The EUT was programmed to be in continuously transmitting mode.

7.5.7 Test Results

EUT:	5G Smart Phone	Model No.:	GQ5002
Temperature:	20 °C	Relative Humidity:	48%
Test Mode:	802.11b/g/n20/n40	Test By:	Mukzi Lee

Test data reference attachment.

7.6 POWER SPECTRAL DENSITY

7.6.1 Applicable Standard

According to FCC Part 15.247(e) and KDB 558074 D01 15.247 Meas Guidance v05r02 Section 8.4.

7.6.2 Conformance Limit

The transmitter power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

7.6.3 Measuring Instruments

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

7.6.4 Test Setup

Please refer to Section 6.1 of this test report.

7.6.5 Test Procedure

The testing follows Measurement Procedure Subclause 11.10.2 of ANSI C63.10

This procedure shall be used if maximum peak conducted output power was used to demonstrate compliance, and is optional if the maximum conducted (average) output power was used to demonstrate compliance.

- a) Set analyzer center frequency to DTS channel center frequency.
- b) Set the span to 1.5 times the DTS bandwidth.
- c) Set the RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
- d) Set the VBW $\geq 3 * \text{RBW}$.
- e) Detector = peak.
- f) Sweep time = auto couple.
- g) Trace mode = max hold.
- h) Allow trace to fully stabilize.
- i) Use the peak marker function to determine the maximum amplitude level within the RBW.
- j) If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

7.6.6 Test Results

EUT:	5G Smart Phone	Model No.:	GQ5002
Temperature:	20 °C	Relative Humidity:	48%
Test Mode:	802.11b/g/n20/n40	Test By:	Mukzi Lee

Test data reference attachment.

7.7 CONDUCTED BAND EDGE MEASUREMENT

7.7.1 Applicable Standard

According to FCC Part 15.247(d) and KDB 558074 D01 15.247 Meas Guidance v05r02 Section 8.7.

7.7.2 Conformance Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator 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, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

7.7.3 Measuring Instruments

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

7.7.4 Test Setup

Please refer to Section 6.1 of this test report.

7.7.5 Test Procedure

The testing follows FCC KDB 558074 D01 15.247 Meas Guidance v05r02 Section 8.7.

The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator.

The path loss was compensated to the results for each measurement.

Set to the maximum power setting and enable the EUT transmit continuously.

The EUT was operating in controlled its channel.

Set RBW to 100 kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.

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.

Repeat above procedures until all measured frequencies were complete.

7.7.6 Test Results

EUT:	5G Smart Phone	Model No.:	GQ5002
Temperature:	20 °C	Relative Humidity:	48%
Test Mode:	802.11b/g/n20/n40	Test By:	Mukzi Lee

Test data reference attachment.

7.8 SPURIOUS RF CONDUCTED EMISSIONS

7.8.1 Conformance Limit

1. Below -20dB of the highest emission level in operating band.
2. Fall in the restricted bands listed in section 15.205. The maximum permitted average field strength is listed in section 15.209.

7.8.2 Measuring Instruments

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

7.8.3 Test Setup

Please refer to Section 6.1 of this test report.

7.8.4 Test 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 26.5GHz.

7.8.5 Test 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 bandedge measurement data.

Test data reference attachment.

7.9 ANTENNA APPLICATION

7.9.1 Antenna 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.

7.9.2 Result

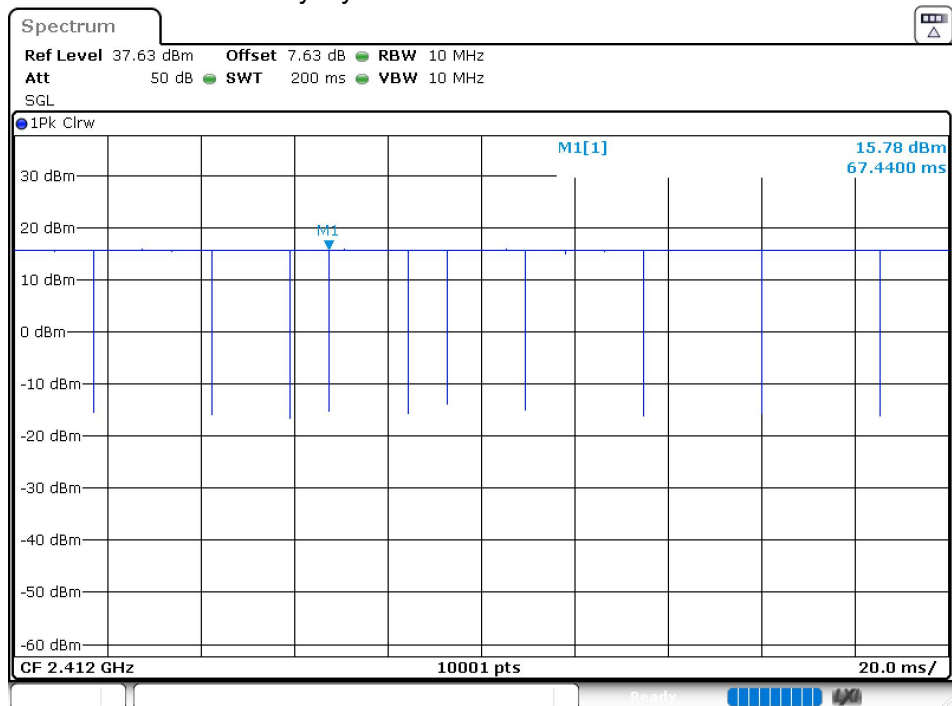
The EUT antenna is permanent attached PIFA Antenna (Gain: 0.3 dBi). It comply with the standard requirement.

8 TEST RESULTS

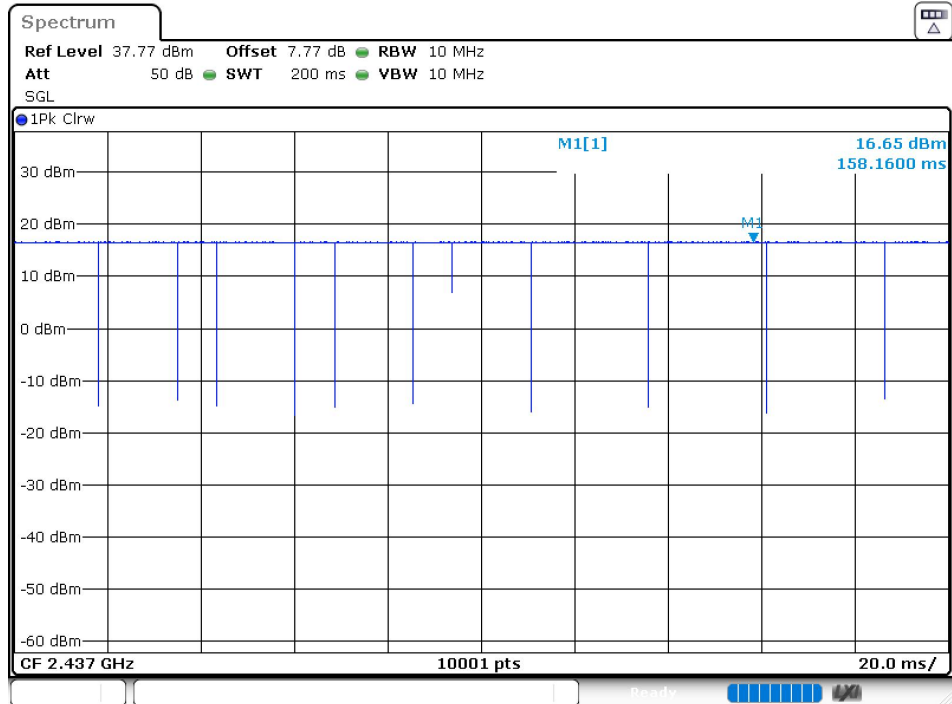
8.1 DUTY CYCLE

Condition	Mode	Frequency (MHz)	Duty Cycle (%)	Correction Factor (dB)
NVNT	802.11b	2412	99.9	0
NVNT	802.11b	2437	99.9	0
NVNT	802.11b	2462	99.9	0
NVNT	802.11g	2412	98.18	0.08
NVNT	802.11g	2437	98.2	0.08
NVNT	802.11g	2462	98.2	0.08
NVNT	802.11n(HT20)	2412	98.06	0.09
NVNT	802.11n(HT20)	2437	98.05	0.09
NVNT	802.11n(HT20)	2462	98.06	0.09
NVNT	802.11n(HT40)	2422	96.32	0.16
NVNT	802.11n(HT40)	2437	96.35	0.16
NVNT	802.11n(HT40)	2452	96.35	0.16

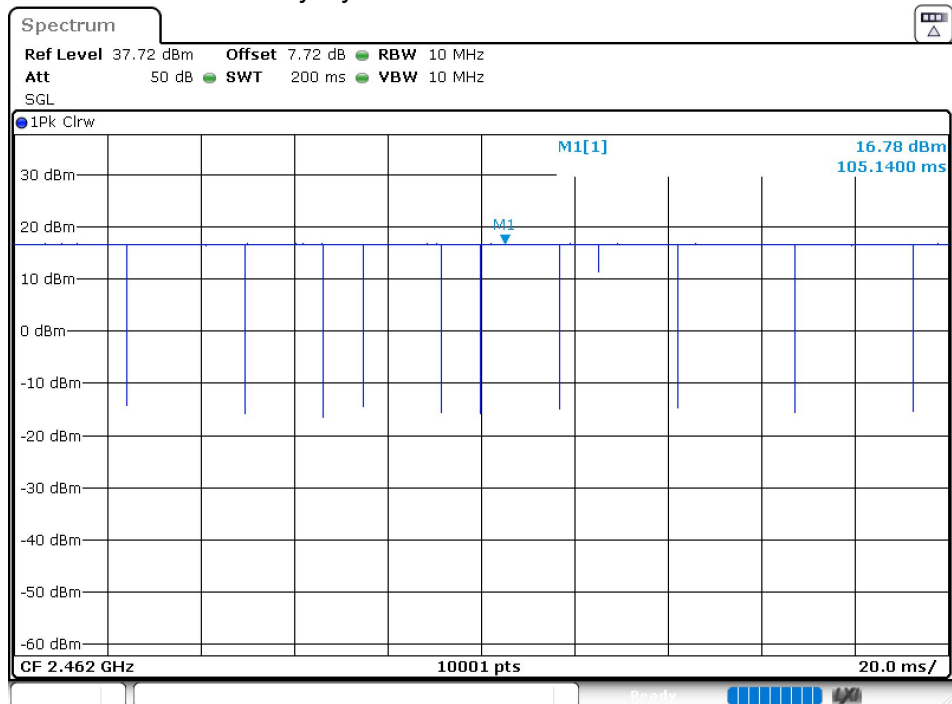
Duty Cycle NVNT 802.11b 2412MHz



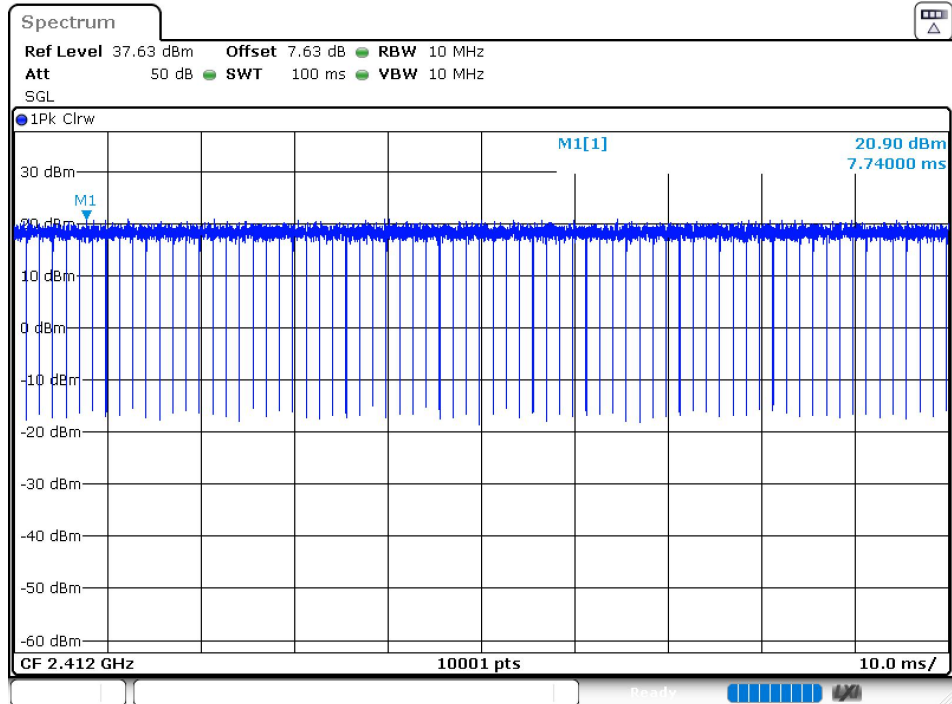
Duty Cycle NVNT 802.11b 2437MHz



Duty Cycle NVNT 802.11b 2462MHz



Duty Cycle NVNT 802.11g 2412MHz



Duty Cycle NVNT 802.11g 2437MHz

