FCC TEST REPORT

FCC ID: 2AVUR-DD18500

Product Name	:	wireless Barcode scanner
Model Name	:	DD18500,XT-83HR
Brand Name	:	N/A
Report No.	:	PTC19122701101E-FC01
Prepared for		
Shengxiaobang (Guangzhou) Material Union Technology Co Ltd.,		
The 4th Floor, Zone B, NO.70 (Factory) ,Pacific Industrial Zone, Xintang Town, Guangzhou City, GuangDong, China		
Prepared by		
Precise Testing & Certification Co., LTD.		
Building 1, No.6 Tongxin Road, Dongcheng Street, Dongguan,China		

1TEST RESULT CERTIFICATION

Applicant's name	:	Shengxiaobang (Guangzhou) Material Union Technology Co Ltd.,
Address	:	The 4th Floor, Zone B, NO.70 (Factory) ,Pacific Industrial Zone, Xintang Town, Guangzhou City, GuangDong, China
Manufacture's name	:	Shengxiaobang (Guangzhou) Material Union Technology Co Ltd.,
Address	:	The 4th Floor, Zone B, NO.70 (Factory) ,Pacific Industrial Zone, Xintang Town, Guangzhou City, GuangDong, China
Product name	:	wireless Barcode scanner
Model name	:	DD18500,XT-83HR
Brand Name	:	N/A
Standards	:	FCC CFR47 Part 15 Section 15.247
Test procedure	:	ANSI C63.10:2013
Test Date	:	Feb. 19, 2020 to Mar. 05, 2020
Date of Issue	:	Mar.06, 2020
Test Result	:	Pass

This device described above has been tested by PTC, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.
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Testing Engineer	August Qiu
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Authorized Signatory	
Chris Du	

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1. General Information

1.1. Description of Device (EUT)

EUT	:	wireless Barcode scanner
Model No.	:	DD18500,XT-83HR
Trade mark	:	N/A
Power supply	:	DC 3.7V from battery or DC 5 V from USB port
Adapter	:	N/A
Radio Technology	:	BT2.0+EDR
Operation frequency	:	2402-2480MHz
Modulation	:	GFSK, π /4 DQPSK,8-DPSK
Antenna Type	:	PCB Antenna, max gain 0dBi.
Applicant	:	Shengxiaobang (Guangzhou) Material Union Technology Co Ltd.,
Address	:	The 4th Floor, Zone B, NO.70 (Factory) Pacific Industrial Zone, Xintang Town, Guangzhou City, GuangDong, China
Manufacturer	:	Shengxiaobang (Guangzhou) Material Union Technology Co Ltd.,
Address	:	The 4th Floor, Zone B, NO.70 (Factory) Pacific Industrial Zone, Xintang Town, Guangzhou City, GuangDong, China

1.2. Accessories of device (EUT)

Description	:	N/A
Manufacturer	:	N/A
Model No.	:	N/A
Input	:	N/A
Output	:	N/A

1.3. Test Lab information

Precise Testing & Certification Co., LTD.
Address: Building 1, No.6 Tongxin Road, Dongcheng Street, Dongguan,China
FCC Registration Number: 790290
A2LA Certificate No.: 4408.01
IC Registration Number: 12191A-1

2. Summary of test

2.1. Summary of test result

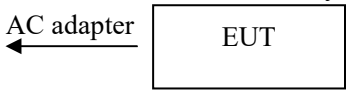
Description of Test Item	Standard	Results
Maximum Peak Output Power	FCC Part 15: 15.247(b)(1) ANSI C63.4 :2014& ANSI C63.10 :2013	PASS
Bandwidth	FCC Part 15: 15.215 ANSI C63.4 :2014& ANSI C63.10 :2013	PASS
Carrier Frequency Separation	FCC Part 15: 15.247(a)(1) ANSI C63.4 :2014& ANSI C63.10 :2013	PASS
Number Of Hopping Channel	FCC Part 15: 15.247(a)(1)(iii) ANSI C63.4 :2014 & ANSI C63.10 :2013	PASS
Dwell Time	FCC Part 15: 15.247(a)(1)(iii) ANSI C63.4 :2014& ANSI C63.10 :2013	PASS
Radiated Emission	FCC Part 15: 15.209 FCC Part 15: 15.247(d) ANSI C63.4 :2014& ANSI C63.10 :2013	PASS
Band Edge Compliance	FCC Part 15: 15.247(d) ANSI C63.4 :2014& ANSI C63.10 :2013	PASS
Power Line Conducted Emissions	FCC Part 15: 15.207 ANSI C63.4 :2014 ANSI C63.10 :2013	PASS
Antenna requirement	FCC Part 15: 15.203	PASS

2.2. Assistant equipment used for test

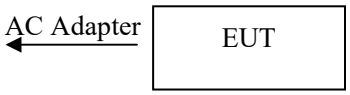
Description : N/A
Manufacturer : N/A
Model No. : N/A
Input : N/A
Output : N/A

2.3. Block Diagram

1, For radiated emissions test: EUT was placed on a turn table, which is 0.8 meter high above ground. EUT was be set into BT test mode by engineer mode before test.



2, For Power Line Conducted Emissions Test: EUT was connected to notebook by 1.5m USB line



2.4. Test mode

Test methodology: Test had been referenced to the DA 00-705. The test was used to control EUT work in Continuous TX mode, and select test channel, wireless mode.

Tested mode, channel, and data rate information		
Mode	Channel	Frequency (MHz)
GFSK	Low :CH1	2402
	Middle: CH40	2441
	High: CH79	2480

Tested mode, channel, and data rate information		
Mode	Channel	Frequency (MHz)
π /4 DQPSK	Low :CH1	2402
	Middle: CH40	2441
	High: CH79	2480

Tested mode, channel, and data rate information		
Mode	Channel	Frequency (MHz)
8- DPSK	Low :CH1	2402
	Middle: CH40	2441
	High: CH79	2480

2.5. Test Conditions

Temperature range	21-25℃
Humidity range	40-75%
Pressure range	86-106kPa

2.6. Measurement Uncertainty (95% confidence levels, k=2)

Parameter	**Uncertainty**
RF output power, conducted	±1.0dB
Power Spectral Density, conducted	±2.2dB
Radio Frequency	± 1 x 10^{-6}
Bandwidth	± 1.5 x 10^{-6}
Time	±2%
Duty Cycle	±2%
Temperature	±1°C
Humidity	±5%
DC and low frequency voltages	±3%
Conducted Emissions (150kHz~30MHz)	±3.64dB
Radiated Emission(30MHz~1GHz)	±5.03dB
Radiated Emission(1GHz~25GHz)	±4.74dB
Remark: The coverage Factor (k=2), and measurement Uncertainty for a level of Confidence of 95%	

2.7. Test Equipment

RF Conducted Test

Name of Equipment	Manufacturer	Model	Serial No.	Characteristics	Calibration Due
MXG Signal Analyzer	Agilent	N9020A	MY56070279	10Hz-30GHz	Sep.19, 2019
Coaxial Cable	CDS	79254	46107086	10Hz-30GHz	Sep.19, 2019
Antenna Connector	Florida RF Labs	N/A	RF01#	N/A	Sep.19, 2019
Power Meter	Anritsu	ML2495A	0949003	N/A	Sep.19, 2019
Power Sensor	Anritsu	MA2411B	0917017	N/A	Sep.19, 2019

Remark: The temporary antenna connector is soldered on the PCB board in order to perform conducted tests and this temporary antenna connector is listed in the equipment list.

Radiated Emissions

Name of Equipment	Manufacturer	Model	Serial No.	Characteristics	Calibration Due
EMI Test Receiver	Rohde&Schwarz	ESCI	101417	9KHz-3GHz	Sep.19, 2019
Loop Antenna	Schwarzbeck	FMZB 1519	012	9 KHz -30MHz	Sep.19, 2019
Bilog Antenna	SCHWARZBECK	VULB9160	9160-3355	25MHz-2GHz	Sep.19, 2019
Preamplifier (low frequency)	SCHWARZBECK	BBV 9475	9745-0013	1MHz-1GHz	Sep.19, 2019
Cable	Schwarzbeck	PLF-100	549489	9KHz-3GHz	Sep.19, 2019
Spectrum Analyzer	Agilent	E4407B	MY45109572	9KHz-40GHz	Sep.19, 2019
Horn Antenna	SCHWARZBECK	9120D	9120D-1246	1GHz-18GHz	Sep.19, 2019
Power Amplifier	LUNAR EM	LNA1G18-40	J10100000081	1GHz-26.5GHz	Sep.19, 2019
Horn Antenna	SCHWARZBECK	BBHA 9170	9170-181	14GHz-40GHz	Sep.25, 2019
Amplifier	SCHWARZBECK	BBV 9721	9721-205	18GHz-40GHz	Sep.19, 2019
Cable	H+S	CBL-26	N/A	1GHz-26.5GHz	Sep.19, 2019
RF Cable	R&S	R204	R21X	1GHz-40GHz	Sep.19, 2019

Conducted Emissions

Name of Equipment	Manufacturer	Model	Serial No.	Characteristics	Calibration Due
EMI Test Receiver	Rohde&Schwarz	ESCI	101417	9KHz-3GHz	Sep.19, 2019
Artificial Mains Network	Rohde&Schwarz	L2-16B	000WX31025	9KHz-300MHz	Sep.19, 2019
Artificial Mains Network	Rohde&Schwarz	ENV216	101342	9KHz-300MHz	Sep.19, 2019

3. Maximum Peak Output power

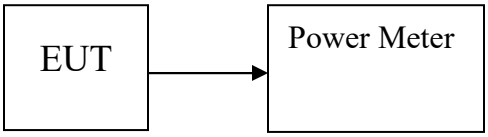
3.1. Limit

Please refersection15.247.

3.2. Test Procedure

The transmitter output is connected to the RF Power Meter. The RF Power Meter is set to the peak power detection.

3.3. Test Setup



3.4. Test Result

EUT: wireless Barcode scanner M/N: DD18500					
Test date: 2020-03-09		Test site: RF site Tested by: Peter			
Mode	Freq (MHz)	PK Output Power (dBm)	PK Output Power (mW)	Limit (dBm)	Margin (dB)
GFSK	2402	3.718	2.354	30	26.282
	2441	3.547	2.263	30	26.453
	2480	4.435	2.777	30	25.565
π /4 DQPSK,	2402	3.546	2.263	21	17.454
	2441	3.683	2.335	21	17.317
	2480	4.137	2.976	21	16.263
8- DPSK	2402	3.373	2.174	21	17.627
	2441	3.486	2.232	21	17.514
	2480	3.435	2.205	21	17.565
Conclusion: PASS					

4. Bandwidth

4.1. Limit

Please refer section15.247.

4.2. Test Procedure

As required by DA 00-705, the transmitter output was coupled to a spectrum analyzer via a antenna. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 30kHz RBW and 100kHz VBW. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

4.3. Test Result

EUT: wireless Barcode scanner		M/N: DD18500		
Test date: 2020-03-09		Test site: RF site	Tested by: Peter	
Mode	Freq (MHz)	20dB Bandwidth (KHz)	99% Bandwidth (kHz)	Conclusion
GFSK	2402	0.8279	/	PASS
	2441	0.8340	/	PASS
	2480	0.7406	/	PASS
π /4 DQPSK	2402	1113	/	PASS
	2441	1118	/	PASS
	2480	1118	/	PASS
8- DPSK	2402	1164	/	PASS
	2441	1165	/	PASS
	2480	1162	/	PASS

Orginal Test data

GFSK:

Agilent Spectrum Analyzer - Occupied BW
Center Freq 2.480000000 GHz
Center Freq: 2.480000000 GHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 30 dB
#IFGain:Low
Radio Std: None
Radio Device: BTS
Frequency
10 dB/div
Ref 10.00 dBm
Log
Center Freq
2.480000000 GHz
Center 2.48 GHz
#Res BW 30 kHz
#VBW 100 kHz
Span 3 MHz
Sweep 3.2 ms
CF Step
300.000 kHz
Auto
Man
Occupied Bandwidth
823.04 kHz
Total Power
10.4 dBm
Freq Offset
0 Hz
Transmit Freq Error
-486 Hz
OBW Power
99.00 %
x dB Bandwidth
740.6 kHz
x dB
-20.00 dB
MSG
STATUS

π/4 DQPSK:

Agilent Spectrum Analyzer - Occupied BW
Center Freq 2.402000000 GHz
Center Freq: 2.402000000 GHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 30 dB
#IFGain:Low
Radio Std: None
Radio Device: BTS
Frequency
10 dB/div
Ref 10.00 dBm
Log
Center Freq
2.402000000 GHz
Center 2.402 GHz
#Res BW 30 kHz
#VBW 100 kHz
Span 3 MHz
Sweep 3.2 ms
CF Step
300.000 kHz
Auto
Man
Occupied Bandwidth
1.0629 MHz
Total Power
9.07 dBm
Freq Offset
0 Hz
Transmit Freq Error
-4.752 kHz
OBW Power
99.00 %
x dB Bandwidth
1.113 MHz
x dB
-20.00 dB
MSG
STATUS

Agilent Spectrum Analyzer - Occupied BW
Center Freq 2.441000000 GHz
Center Freq: 2.441000000 GHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 30 dB
#IFGain:Low
Radio Std: None
Radio Device: BTS
Frequency
10 dB/div
Ref 10.00 dBm
Center Freq
2.441000000 GHz
Center 2.441 GHz
#Res BW 30 kHz
#VBW 100 kHz
Span 3 MHz
Sweep 3.2 ms
CF Step
300.000 kHz
Auto
Man
Occupied Bandwidth
1.0616 MHz
Total Power
9.78 dBm
Freq Offset
0 Hz
Transmit Freq Error
-2.943 kHz
OBW Power
99.00 %
x dB Bandwidth
1.118 MHz
x dB
-20.00 dB
MSG
STATUS

Agilent Spectrum Analyzer - Occupied BW
Center Freq 2.480000000 GHz
Center Freq: 2.480000000 GHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 30 dB
#IFGain:Low
Radio Std: None
Radio Device: BTS
Trace/Detector
10 dB/div
Ref 10.00 dBm
Clear Write
Average
Max Hold
Min Hold
Center 2.48 GHz
#Res BW 30 kHz
#VBW 100 kHz
Span 3 MHz
Sweep 3.2 ms
Occupied Bandwidth
1.0627 MHz
Total Power
9.67 dBm
Detector
Peak
Auto
Man
Transmit Freq Error
-3.163 kHz
OBW Power
99.00 %
x dB Bandwidth
1.118 MHz
x dB
-20.00 dB
MSG
STATUS

8- DPSK:

Agilent Spectrum Analyzer - Occupied BW
Center Freq 2.402000000 GHz
Center Freq: 2.402000000 GHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 30 dB
Radio Std: None
Radio Device: BTS
#IFGain:Low
Trace/Detector
10 dB/div
Ref 10.00 dBm
Log
Clear Write
Average
Max Hold
Min Hold
Center 2.402 GHz
#Res BW 30 kHz
#VBW 100 kHz
Span 3 MHz
Sweep 3.2 ms
Occupied Bandwidth
1.0993 MHz
Total Power
8.63 dBm
Transmit Freq Error
-5.715 kHz
OBW Power
99.00 %
x dB Bandwidth
1.164 MHz
x dB
-20.00 dB
Detector
Peak
Auto
Man
MSG
STATUS

Agilent Spectrum Analyzer - Occupied BW
Center Freq 2.441000000 GHz
Center Freq: 2.441000000 GHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 30 dB
Radio Std: None
Radio Device: BTS
#IFGain:Low
Trace/Detector
10 dB/div
Ref 10.00 dBm
Log
Clear Write
Average
Max Hold
Min Hold
Center 2.441 GHz
#Res BW 30 kHz
#VBW 100 kHz
Span 3 MHz
Sweep 3.2 ms
Occupied Bandwidth
1.1044 MHz
Total Power
9.02 dBm
Transmit Freq Error
-4.914 kHz
OBW Power
99.00 %
x dB Bandwidth
1.165 MHz
x dB
-20.00 dB
Detector
Peak
Auto
Man
MSG
STATUS

Agilent Spectrum Analyzer - Occupied BW
Center Freq 2.480000000 GHz
Center Freq: 2.480000000 GHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 30 dB
#IFGain:Low
Radio Std: None
Radio Device: BTS
Frequency
10 dB/div
Ref 10.00 dBm
Log
Center Freq
2.480000000 GHz
Center 2.48 GHz
#Res BW 30 kHz
#VBW 100 kHz
Span 3 MHz
Sweep 3.2 ms
CF Step
300.000 kHz
Auto
Man
Occupied Bandwidth
1.1013 MHz
Total Power
8.93 dBm
Freq Offset
0 Hz
Transmit Freq Error
-4.334 kHz
OBW Power
99.00 %
x dB Bandwidth
1.162 MHz
x dB
-20.00 dB
MSG
STATUS

5. Carrier Frequency Separation

5.1. Limit

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW

5.2. Test Procedure

The transmitter output was coupled to a spectrum analyzer via a antenna. The carrier frequency was measured by spectrum analyzer with 30kHz RBW and 100kHz VBW.

5.3. Test Result

EUT: wireless Barcode scanner		M/N: DD18500		
Test date: 2020-03-09		Test site: RF site	Tested by: Peter	
Mode/Channel	Channel separation (KHz)	20dB Bandwidth (KHz)	Limit (KHz) 2/3 20dB bandwidth	Conclusion
GFSK	1008	0.834	0.556	PASS
π /4 DQPSK	1008	1118.000	745.333	PASS
8- DPSK	1026	1165.000	776.667	PASS

Orginal test data for channel separation

GFSK

π/4 DQPSK

8- DPSK:

Agilent Spectrum Analyzer - Swept SA
Marker 1 Δ -1.026000000 MHz
PNO: Wide
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
ΔMkr1 -1.026 MHz
-0.379 dB
10 dB/div
Log
Ref 10.00 dBm
1Δ2
2
Center 2.441000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 3.000 MHz
Sweep 1.000 ms (1001 pts)
Marker
Select Marker
Normal
Delta
Fixed
Off
Properties
More
1 of 2

6. Number Of Hopping Channel

6.1. Limit

Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels

6.2. Test Procedure

The transmitter output was coupled to a spectrum analyzer via a antenna. The number of hopping channel was measured by spectrum analyzer with 100kHz RBW and 300KHz VBW.

6.3. Test Result

EUT: wireless Barcode scanner	M/N: DD18500		
Test date: 2020-03-09	Test site: RF site	Tested by: Peter	
Mode	Number of hopping channel	Limit	Conclusion
GFSK	79	>15	PASS
π/4 DQPSK	79	>15	PASS
8- DPSK	79	>15	PASS

Original test data for hopping channel number

GFSK

π/4 DQPSK

8- DPSK:

Agilent Spectrum Analyzer - Swept SA
Marker 1 Δ -78.072500000 MHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
ΔMkr1 -78.072 5 MHz
-1.044 dB
10 dB/div
Log
Ref 10.00 dBm
1Δ2
X2
Start 2.40000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.48350 GHz
Sweep 8.000 ms (1001 pts)
Marker
Select Marker
Normal
Delta
Fixed
Off
Properties
More
1 of 2
MSG
STATUS

7. Dwell Time

7.1. Test limit

Please refer section15.247.

7.2. Test Procedure

7.2.1. Place the EUT on the table and set it in transmitting mode.

7.2.2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

7.2.3. Set center frequency of spectrum analyzer = operating frequency.

7.2.4. Set the spectrum analyzer as RBW, VBW=1MHz, Span = 0Hz, Sweep = auto.

7.2.5. Repeat above procedures until all frequency measured were complete.

7.3. Test Results

PASS.

Detailed information please see the following page.

EUT: wireless Barcode scanner M/N: DD18500						
Test date: 2020-03-09		Test site: RF site Tested by: Peter				
Mode	Data Packet	Frequency (MHz)	Pulse Duration (ms)	Dwell Time (s)	Limit (s)	Conclusion
GFSK	DH1	2441	0.365	0.234	<0.4	PASS
	DH3	2441	1.625	0.347	<0.4	PASS
	DH5	2441	2.858	0.366	<0.4	PASS
π /4 DQPSK	DH1	2441	0.3733	0.239	<0.4	PASS
	DH3	2441	1.625	0.347	<0.4	PASS
	DH5	2441	2.875	0.368	<0.4	PASS
8- DPSK	DH1	2441	0.3733	0.239	<0.4	PASS
	DH3	2441	1.625	0.347	<0.4	PASS
	DH5	2441	2.875	0.368	<0.4	PASS

Note: 1 A period time = 0.4 (s) * 79 = 31.6(s)

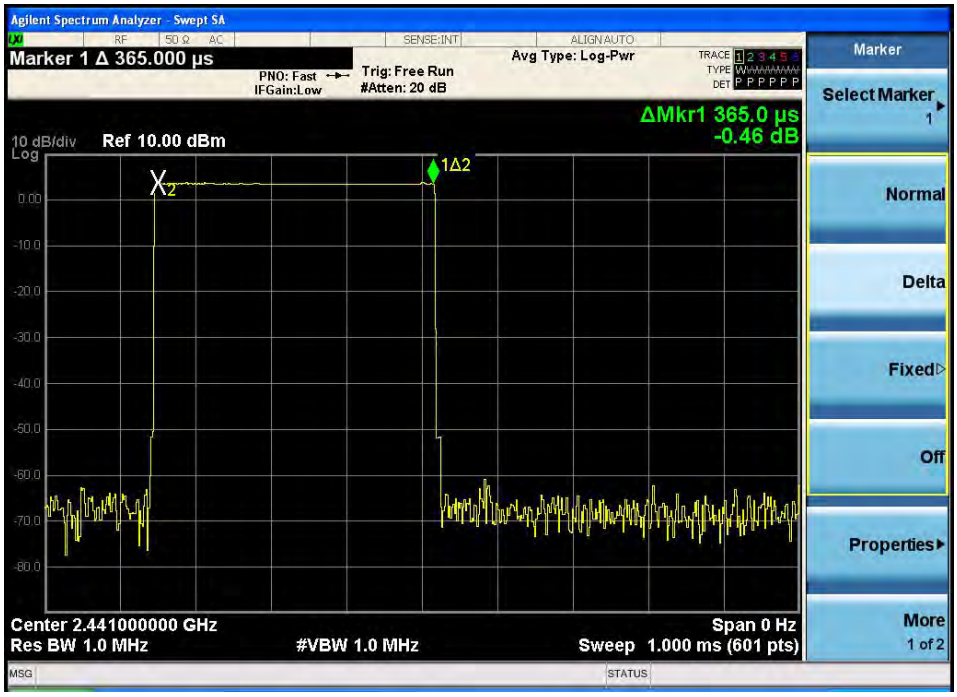
2 DH1 time slot = Pulse Duration * (1600/(1*79)) * A period time

DH3 time slot = Pulse Duration * (1600/(3*79)) * A period time

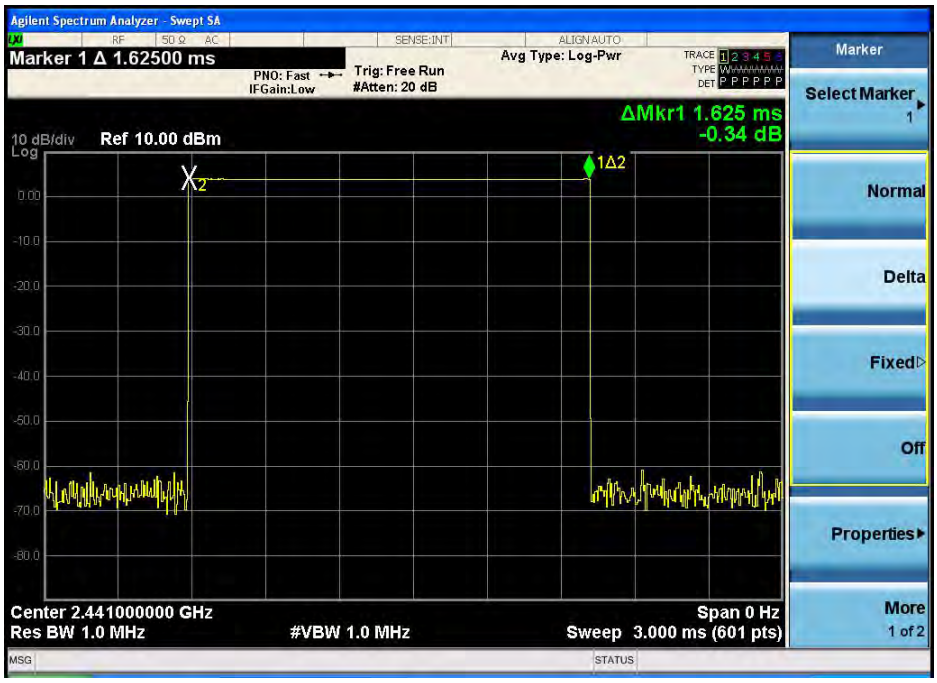
DH5 time slot = Pulse Duration * (1600/(5*79)) * A period time

GFSK

DH1:

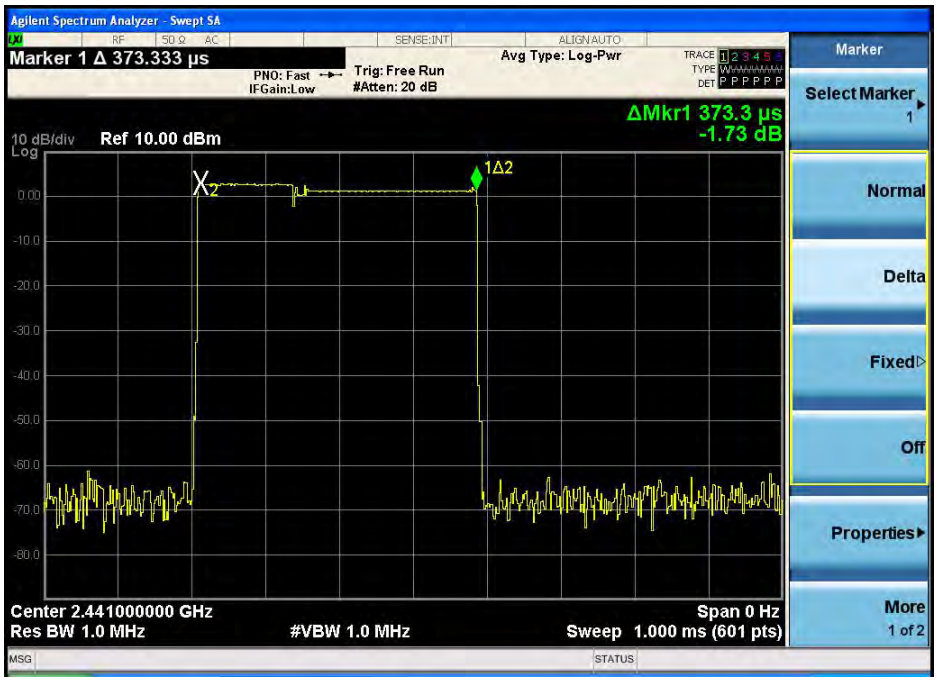

Agilent Spectrum Analyzer - Swept SA
Marker 1 Δ 365.000 µs
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 20 dB
Avg Type: Log-Pwr
ΔMkr1 365.0 µs
-0.46 dB
10 dB/div
Log
Ref 10.00 dBm
Center 2.441000000 GHz
Res BW 1.0 MHz
#VBW 1.0 MHz
Span 0 Hz
Sweep 1.000 ms (601 pts)
Marker
Select Marker
Normal
Delta
Fixed
Off
Properties
More
1 of 2

DH3:

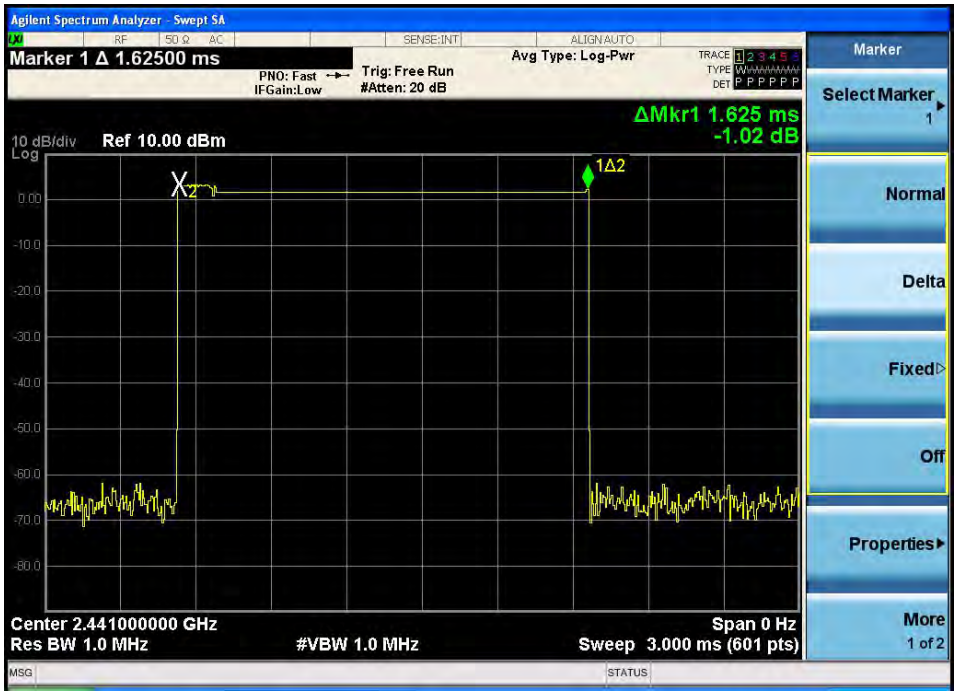

Agilent Spectrum Analyzer - Swept SA
Marker 1 Δ 1.62500 ms
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 20 dB
Avg Type: Log-Pwr
ΔMkr1 1.625 ms
-0.34 dB
10 dB/div
Log
Ref 10.00 dBm
Center 2.441000000 GHz
Res BW 1.0 MHz
#VBW 1.0 MHz
Span 0 Hz
Sweep 3.000 ms (601 pts)
Marker
Select Marker
Normal
Delta
Fixed
Off
Properties
More
1 of 2

DH5

π/4 DQPSK
DH1



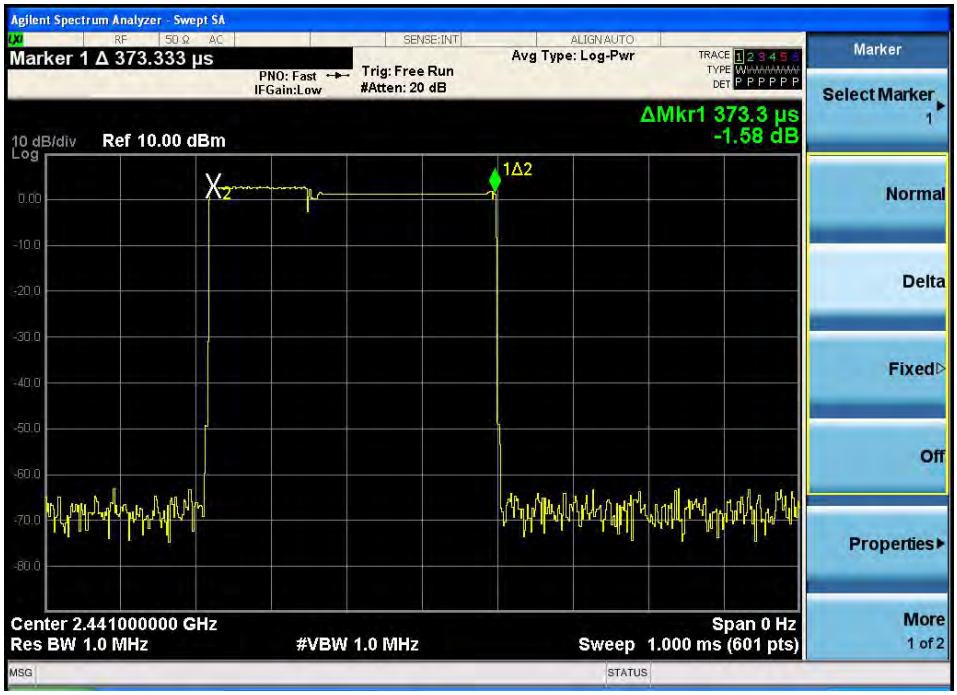
DH3

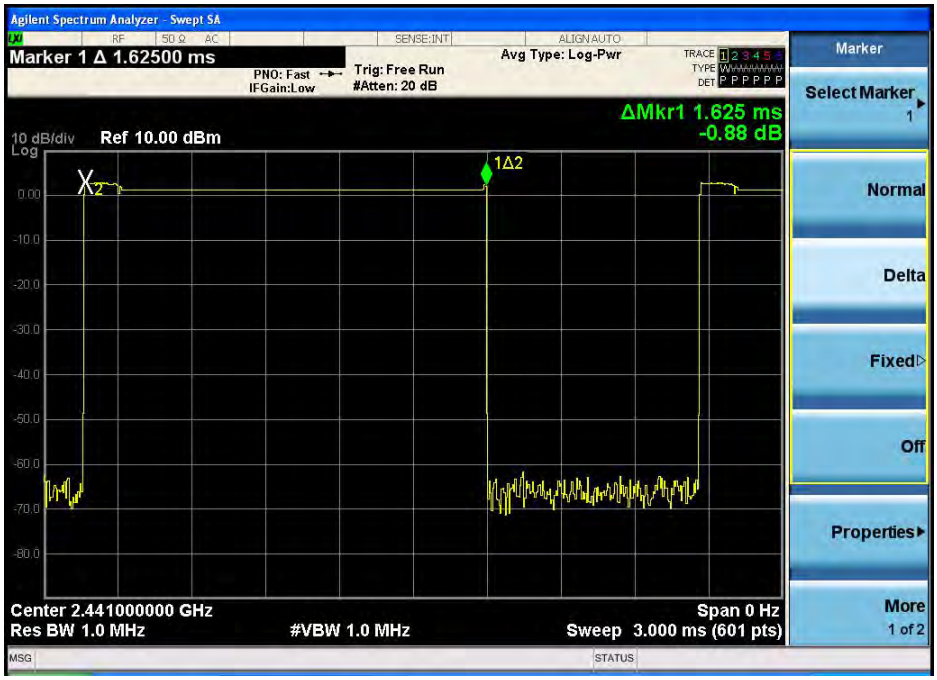

Agilent Spectrum Analyzer - Swept SA
Marker 1 Δ 1.62500 ms
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 20 dB
Avg Type: Log-Pwr
ΔMkr1 1.625 ms
-1.02 dB
10 dB/div
Ref 10.00 dBm
Log
Center 2.441000000 GHz
Res BW 1.0 MHz
#VBW 1.0 MHz
Span 0 Hz
Sweep 3.000 ms (601 pts)
Marker
Select Marker
Normal
Delta
Fixed
Off
Properties
More
1 of 2

DH5

Agilent Spectrum Analyzer - Swept SA
Marker 1 Δ 2.87500 ms
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 20 dB
Avg Type: Log-Pwr
ΔMkr1 2.875 ms
-1.71 dB
10 dB/div
Ref 10.00 dBm
Log
Center 2.441000000 GHz
Res BW 1.0 MHz
#VBW 1.0 MHz
Span 0 Hz
Sweep 5.000 ms (601 pts)
Marker
Select Marker
Normal
Delta
Fixed
Off
Properties
More
1 of 2

8- DPSK:


Agilent Spectrum Analyzer - Swept SA
Marker 1 Δ 373.333 µs
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 20 dB
Avg Type: Log-Pwr
ΔMkr1 373.3 µs
-1.58 dB
10 dB/div
Ref 10.00 dBm
Log
1Δ2
Center 2.441000000 GHz
Res BW 1.0 MHz
#VBW 1.0 MHz
Span 0 Hz
Sweep 1.000 ms (601 pts)
Marker
Select Marker
Normal
Delta
Fixed
Off
Properties
More
1 of 2


Agilent Spectrum Analyzer - Swept SA
Marker 1 Δ 1.62500 ms
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 20 dB
Avg Type: Log-Pwr
ΔMkr1 1.625 ms
-0.88 dB
10 dB/div
Ref 10.00 dBm
Log
1Δ2
Center 2.441000000 GHz
Res BW 1.0 MHz
#VBW 1.0 MHz
Span 0 Hz
Sweep 3.000 ms (601 pts)
Marker
Select Marker
Normal
Delta
Fixed
Off
Properties
More
1 of 2

Agilent Spectrum Analyzer - Swept SA
Marker 1 Δ 2.87500 ms
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 20 dB
Avg Type: Log-Pwr
ΔMkr1 2.875 ms
-1.46 dB
10 dB/div
Log
Ref 10.00 dBm
1Δ2
Center 2.441000000 GHz
Res BW 1.0 MHz
#VBW 1.0 MHz
Span 0 Hz
Sweep 5.000 ms (601 pts)
Recall
State
Trace
(+ State)
Data
(Import)
Trace 1
MSG
STATUS

8. Radiated emissions

8.1. Limit

All the emissions appearing within FCC Part 15 restricted frequency bands shall not exceed the limits shown in FCC Part 15, all the other emissions shall be at least 20dB below the fundamental emissions, or comply with FCC Part 15 limits.

FCC Part 15 Restricted frequency band

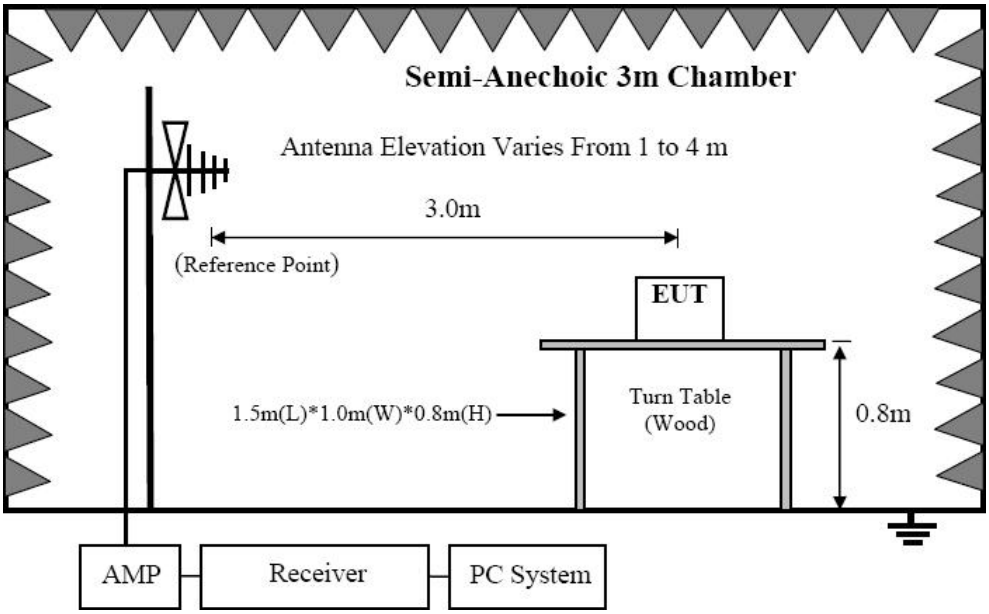
MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	([2])

FCC Part 15 Limit

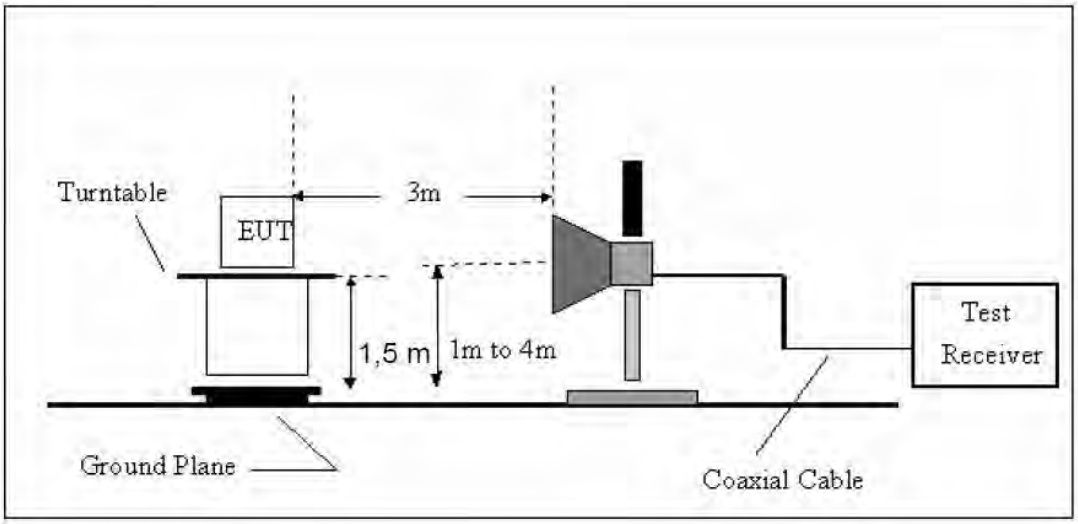
FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMIT	
		μV/m	dB(μV)/m
0.009-0.490	300	2400/F(KHz)	/
0.490-1.705	30	24000/F(KHz)	/
1.705-30	30	30	29.5
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
960 ~ 1000	3	500	54.0
Above 1000	3	74.0 dB(μV)/m (Peak) 54.0 dB(μV)/m (Average)	

8.2. Block Diagram of Test setup

8.2.1 In 3m Anechoic Chamber Test Setup Diagram for below 1GHz



8.2.2 In 3m Anechoic Chamber Test Setup Diagram for frequency above 1GHz



Note: For harmonic emissions test a appropriate high pass filter was inserted in the input port of AMP.

8.3. Test Procedure

(1) EUT was placed on a non-metallic table, 80 cm above the ground plane inside a semi-anechoic chamber for below 1GHz testing, and 150cm for above 1GHz testing.
(2) Setup EUT and simulator as shown in section 1.4 and 6.1
(3) Test antenna was located 3m from the EUT on an adjustable mast. Below pre-scan procedure was first performed in order to find prominent radiated emissions.
(a) Change work frequency or channel of device if practicable.
(b) Change modulation type of device if practicable.
(c) Rotated EUT though three orthogonal axes to determine the attitude of EUT arrangement produces highest emissions
(4) Spectrum frequency from 9KHz to 25GHz (tenth harmonic of fundamental frequency) was investigated
(5) For final emissions measurements at each frequency of interest, the EUT were rotated and the antenna height was varied between 1m and 4m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to ANSI C63.10 2013 on Radiated Emission test.
(6) For emissions above 1GHz, both Peak and Average level were measured with Spectrum Analyzer, and the RBW is set at 1MHz, VBW is set at 3MHz for Peak measure; RBW is set at 1MHz, VBW is set at 10Hz for Average measure.

8.4. Test Result

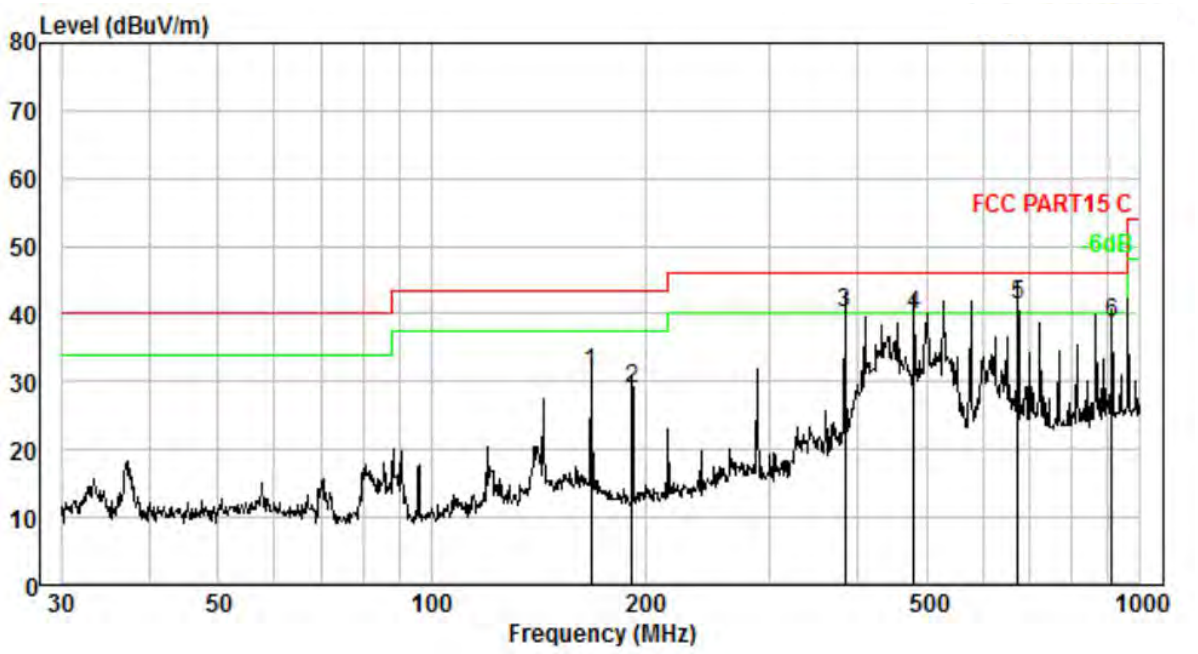
We have scanned the 10th harmonic from 9KHz to the EUT.
Detailed information please see the following page.

From 9KHz to 30MHz: Conclusion: PASS

Note: The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

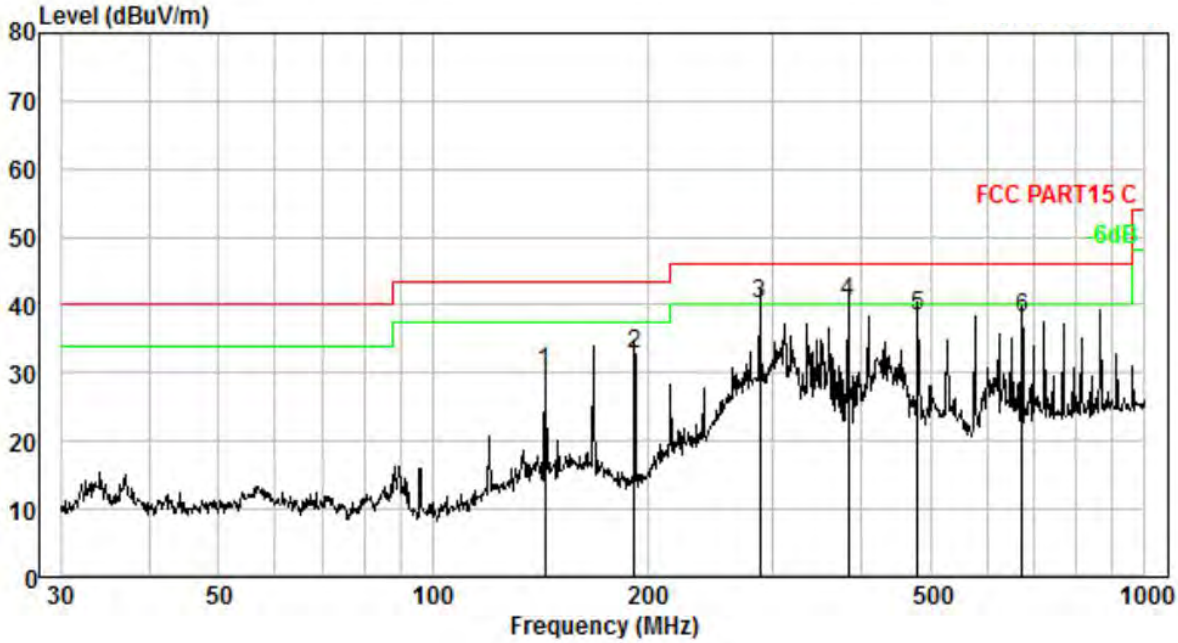
From 30MHz to 1000MHz: Conclusion: PASS

Vertical



No.	Freq MHz	Cable Loss dB	ANT Factor dB/m	Receiver Reading dBuV	Preamp Factor dB	Emission Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark
1.	167.824	4.16	13.45	43.67	30.03	31.25	43.50	-12.25	QP
2.	191.745	4.39	11.60	43.06	30.04	29.01	43.50	-14.49	QP
3.	383.932	5.59	14.68	50.41	30.65	40.03	46.00	-5.97	QP
4.	480.528	5.97	16.65	48.18	30.86	39.94	46.00	-6.06	QP
5.	672.845	6.55	19.83	46.15	31.06	41.47	46.00	-4.53	QP
6.	912.862	7.07	22.15	40.59	31.04	38.77	46.00	-7.23	QP

Horizontal



No.	Freq MHz	Cable Loss dB	ANT Factor dB/m	Receiver Reading dBuV	Preamp Factor dB	Emission Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark
1.	143.830	3.90	13.46	42.80	30.02	30.14	43.50	-13.36	QP
2.	191.745	4.39	11.60	46.86	30.04	32.81	43.50	-10.69	QP
3.	287.990	5.09	13.04	52.36	30.29	40.20	46.00	-5.80	QP
4.	383.932	5.59	14.68	50.70	30.65	40.32	46.00	-5.68	QP
5.	480.528	5.97	16.65	46.72	30.86	38.48	46.00	-7.52	QP
6.	672.845	6.55	19.83	42.62	31.06	37.94	46.00	-8.06	QP

Remark: All modes have been tested, and only worst data of GFSK mode, Channel 2402MHz was listed in this report.

1GHz—25GHz Radiated emissison Test result									
EUT: wireless Barcode scanner M/N: DD18500									
Power: DC 3.7V from battery									
Test date: 2020-03-09 Test site: 3m Chamber Tested by: Peter									
Test mode: GFSK Tx CH1 2402MHz									
Antenna polarity: Vertical									
No	Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4804	43.14	33.95	10.18	34.26	53.01	74	20.99	PK
2	4804	32.3	33.95	10.18	34.26	42.17	54	11.83	AV
3	7206	/							
4	9608	/							
5	12010	/							
Antenna Polarity: Horizontal									
1	4804	43.49	33.95	10.18	34.26	53.36	74	20.64	PK
2	4804	32.35	33.95	10.18	34.26	42.22	54	11.78	AV
3	7206	/							
4	9608	/							
5	12010	/							

Note:
1, Measuring frequency from 1GHz to 25GHz
2, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK
2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK
3, Result = Read level + Antenna factor + cable loss-Amp factor
4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.

1GHz—25GHz Radiated emissison Test result									
EUT: wireless Barcode scanner M/N: DD18500									
Power: DC 3.7V from battery									
Test date: 2020-03-09 Test site: 3m Chamber Tested by: Peter									
Test mode: GFSK Tx CH40 2441MHz									
Antenna polarity: Vertical									
No	Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4882	42.97	33.93	10.2	34.29	52.81	74	21.19	PK
2	4882	31.99	33.93	10.2	34.29	41.83	54	12.17	AV
3	7323	/							
4	9764	/							
5	12205	/							
Antenna Polarity: Horizontal									
1	4882	43.14	33.93	10.2	34.29	52.98	74	21.02	PK
2	4882	31.48	33.93	10.2	34.29	41.32	54	12.68	AV
3	7323	/							
4	9764	/							
5	12205	/							

Note:
1, Measuring frequency from 1GHz to 25GHz
2, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK
2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK
3, Result = Read level + Antenna factor + cable loss-Amp factor
4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.

1GHz—25GHz Radiated emissison Test result									
EUT: wireless Barcode scanner M/N: DD18500									
Power: DC 3.7V from battery									
Test date: 2020-03-09 Test site: 3m Chamber Tested by: Peter									
Test mode: GFSK Tx CH79 2480MHz									
Antenna polarity: Vertical									
No	Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4960	43.6	33.98	10.22	34.25	53.55	74	20.45	PK
2	4960	32.11	33.98	10.22	34.25	42.06	54	11.94	AV
3	7440	/							
4	9920	/							
5	12400	/							
Antenna Polarity: Horizontal									
1	4960	43.69	33.98	10.22	34.25	53.64	74	20.36	PK
2	4960	32.59	33.98	10.22	34.25	42.54	54	11.46	AV
3	7440	/							
4	9920	/							
5	12400	/							

Note:
1, Measuring frequency from 1GHz to 25GHz
2, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK
2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK
3, Result = Read level + Antenna factor + cable loss-Amp factor
4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.

1GHz—25GHz Radiated emissison Test result									
EUT: wireless Barcode scanner M/N: DD18500									
Power: DC 3.7V from battery									
Test date: 2020-03-09 Test site: 3m Chamber Tested by: Peter									
Test mode: π /4 DQPSK Tx CH1 2402MHz									
Antenna polarity: Vertical									
No	Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4804	43.38	33.95	10.18	34.26	53.25	74	20.75	PK
2	4804	32.97	33.95	10.18	34.26	42.84	54	11.16	AV
3	7206	/							
4	9608	/							
5	12010	/							
Antenna Polarity: Horizontal									
1	4804	43.47	33.95	10.18	34.26	53.34	74	20.66	PK
2	4804	32.34	33.95	10.18	34.26	42.21	54	11.79	AV
3	7206	/							
4	9608	/							
5	12010	/							

Note:
1, Measuring frequency from 1GHz to 25GHz
2, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK
2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK
3, Result = Read level + Antenna factor + cable loss-Amp factor
4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.

1GHz—25GHz Radiated emissison Test result									
EUT: wireless Barcode scanner M/N: DD18500									
Power: DC 3.7V from battery									
Test date: 2020-03-09 Test site: 3m Chamber Tested by: Peter									
Test mode: π /4 DQPSK Tx CH40 2441MHz									
Antenna polarity: Vertical									
No	Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4882	43.23	33.93	10.2	34.29	53.07	74	20.93	PK
2	4882	32.25	33.93	10.2	34.29	42.09	54	11.91	AV
3	7323	/							
4	9764	/							
5	12205	/							
Antenna Polarity: Horizontal									
1	4882	43.05	33.93	10.2	34.29	52.89	74	21.11	PK
2	4882	31.89	33.93	10.2	34.29	41.73	54	12.27	AV
3	7323	/							
4	9764	/							
5	12205	/							

Note:
1, Measuring frequency from 1GHz to 25GHz
2, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK
2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK
3, Result = Read level + Antenna factor + cable loss-Amp factor
4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.

1GHz—25GHz Radiated emissison Test result									
EUT: wireless Barcode scanner M/N: DD18500									
Power: DC 3.7V from battery									
Test date: 2020-03-09 Test site: 3m Chamber Tested by: Peter									
Test mode: π /4 DQPSK Tx CH79 2480MHz									
Antenna polarity: Vertical									
No	Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4960	43.68	33.98	10.22	34.25	53.63	74	20.37	PK
2	4960	32.35	33.98	10.22	34.25	42.3	54	11.7	AV
3	7440	/							
4	9920	/							
5	12400	/							
Antenna Polarity: Horizontal									
1	4960	43.62	33.98	10.22	34.25	53.57	74	20.43	PK
2	4960	32.82	33.98	10.22	34.25	42.77	54	11.23	AV
3	7440	/							
4	9920	/							
5	12400	/							

Note:
1, Measuring frequency from 1GHz to 25GHz
2, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK
2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK
3, Result = Read level + Antenna factor + cable loss-Amp factor
4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.

1GHz—25GHz Radiated emissison Test result									
EUT: wireless Barcode scanner M/N: DD18500									
Power: DC 3.7V From battery									
Test date: 2020-03-09 Test site: 3m Chamber Tested by: Peter									
Test mode: 8- DQPSK Tx CH1 2402MHz									
Antenna polarity: Vertical									
No	Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4804	43.48	33.95	10.18	34.26	53.35	74	20.65	PK
2	4804	32.15	33.95	10.18	34.26	42.02	54	11.98	AV
3	7206	/							
4	9608	/							
5	12010	/							
Antenna Polarity: Horizontal									
1	4804	43.32	33.95	10.18	34.26	53.19	74	20.81	PK
2	4804	32.07	33.95	10.18	34.26	41.94	54	12.06	AV
3	7206	/							
4	9608	/							
5	12010	/							

Note:
1, Measuring frequency from 1GHz to 25GHz
2, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK
2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK
3, Result = Read level + Antenna factor + cable loss-Amp factor
4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.

1GHz—25GHz Radiated emissison Test result									
EUT: wireless Barcode scanner M/N: DD18500									
Power: DC 3.7V From battery									
Test date: 2020-03-09 Test site: 3m Chamber Tested by: Peter									
Test mode: 8- DQPSK Tx CH40 2441MHz									
Antenna polarity: Vertical									
No	Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4882	43.35	33.93	10.2	34.29	53.19	74	20.81	PK
2	4882	32.23	33.93	10.2	34.29	42.07	54	11.93	AV
3	7323	/							
4	9764	/							
5	12205	/							
Antenna Polarity: Horizontal									
1	4882	43.38	33.93	10.2	34.29	53.22	74	20.78	PK
2	4882	32.33	33.93	10.2	34.29	42.17	54	11.83	AV
3	7323	/							
4	9764	/							
5	12205	/							

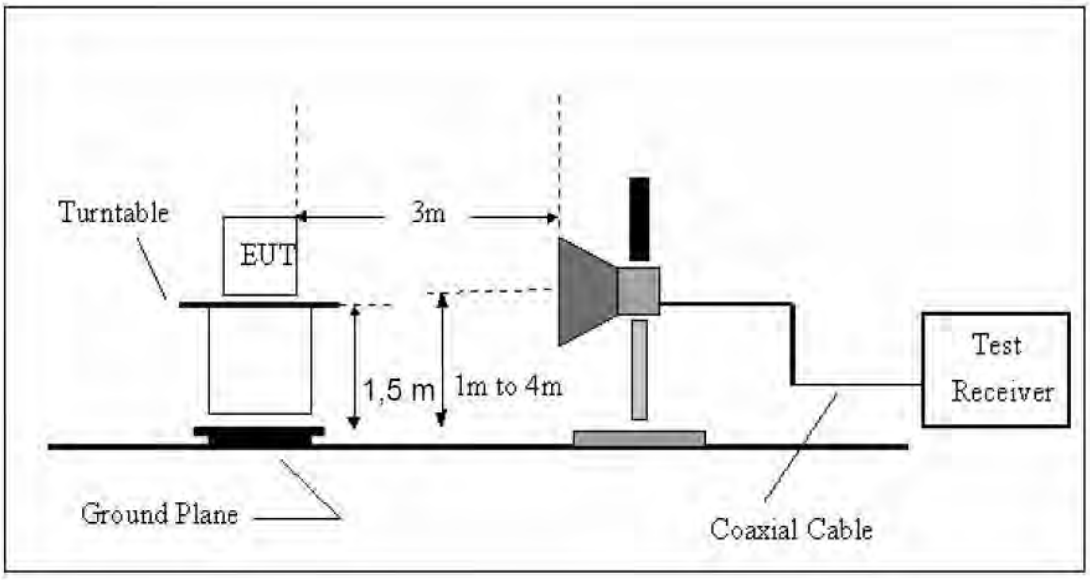
Note:
1, Measuring frequency from 1GHz to 25GHz
2, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK
2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK
3, Result = Read level + Antenna factor + cable loss-Amp factor
4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.

1GHz—25GHz Radiated emissison Test result									
EUT: wireless Barcode scanner M/N: DD18500									
Power: DC 3.7V From battery									
Test date: 2020-03-09 Test site: 3m Chamber Tested by: Peter									
Test mode: 8- DQPSK Tx CH79 2480MHz									
Antenna polarity: Vertical									
No	Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4960	43.42	33.98	10.22	34.25	53.37	74	20.63	PK
2	4960	33.3	33.98	10.22	34.25	43.25	54	10.75	AV
3	7440	/							
4	9920	/							
5	12400	/							
Antenna Polarity: Horizontal									
1	4960	43.65	33.98	10.22	34.25	53.6	74	20.4	PK
2	4960	32.88	33.98	10.22	34.25	42.83	54	11.17	AV
3	7440	/							
4	9920	/							
5	12400	/							

Note:
1, Measuring frequency from 1GHz to 25GHz
2, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK
2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK
3, Result = Read level + Antenna factor + cable loss-Amp factor
4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.

9. Band Edge Compliance

9.1. Block Diagram of Test Setup



9.2. Limit

All the lower and upper band-edges emissions appearing within restricted frequency bands shall not exceed the limits shown in FCC Part 15, all the other emissions outside operation shall be at least 20dB below the fundamental emissions, or comply with FCC Part 15 limits.

9.3. Test Procedure

All restriction band and non- restriction band have been tested， only worse case is reported.

9.4. Test Result

PASS. (See below detailed test data)

Radiated Method

GFSK (CH Low)

Band Edge Test result								
EUT: wireless Barcode scanner M/N: DD18500								
Power: DC 3.7V from battery								
Test date: 2020-03-09 Test site: 3m Chamber Tested by: Peter								
Test mode: Tx CH Low 2402MHz								
Antenna polarity: Vertical								
Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2390	44.08	27.62	3.92	34.97	40.65	74	33.35	**PK**
2390	--	27.62	3.92	34.97	--	54	--	AV
Antenna Polarity: Horizontal								
2390	43.27	27.62	3.92	34.97	39.84	74	34.16	**PK**
2390	--	27.62	3.92	34.97	--	54	--	AV

Note:
1, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK
2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK
3, Result = Read level + Antenna factor + cable loss-Amp factor
4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.

GFSK (CH High)

Band Edge Test result								
EUT: wireless Barcode scanner					M/N: DD18500			
Power: DC 3.7V from battery								
Test date: 2020-03-09		Test site: 3m Chamber			Tested by: Peter			
Test mode: Tx CH High 2480MHz								
Antenna polarity: Vertical								
Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2483.5	43.49	27.89	4	34.97	40.41	74	33.59	**PK**
2483.5	--	27.89	4	34.97	--	54	--	AV
Antenna Polarity: Horizontal								
2483.5	43.64	27.89	4	34.97	40.56	74	33.44	**PK**
2483.5	--	27.89	4	34.97	--	54	--	AV

Note:
1, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK
2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK
3, Result = Read level + Antenna factor + cable loss-Amp factor
4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.

GFSK (Hopping Low)

Band Edge Test result								
EUT: wireless Barcode scanner					M/N: DD18500			
Power: DC 3.7V from battery								
Test date: 2020-03-09		Test site: 3m Chamber			Tested by: Peter			
Test mode: Tx								
Antenna polarity: Vertical								
Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2390	42.32	27.62	3.92	34.97	38.89	74	35.11	**PK**
2390	--	27.62	3.92	34.97	--	54	--	AV
Antenna Polarity: Horizontal								
2390	43.27	27.62	3.92	34.97	39.84	74	34.16	**PK**
2390	--	27.62	3.92	34.97	--	54	--	AV

Note:
1, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK
2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK
3, Result = Read level + Antenna factor + cable loss-Amp factor
4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.

GFSK (Hopping High)

Band Edge Test result								
EUT: wireless Barcode scanner					M/N: DD18500			
Power: DC 3.7V from battery								
Test date: 2020-03-09		Test site: 3m Chamber			Tested by: Peter			
Test mode: Tx								
Antenna polarity: Vertical								
Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2483.5	42.79	27.89	4	34.97	39.71	74	34.29	**PK**
2483.5	--	--	--	--	--	54	--	AV
Antenna Polarity: Horizontal								
2483.5	43.01	27.89	4	34.97	39.93	74	34.07	**PK**
2483.5	--	--	--	--	--	54	--	AV

Note:
1, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK
2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK
3, Result = Read level + Antenna factor + cable loss-Amp factor
4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.

π/4 DQPSK (CH Low)

Band Edge Test result								
EUT: wireless Barcode scanner					M/N: DD18500			
Power: DC 3.7V from battery								
Test date: 2020-03-09		Test site: 3m Chamber			Tested by: Peter			
Test mode: Tx CH Low 2402MHz								
Antenna polarity: Vertical								
Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2390	43.09	27.62	3.92	34.97	39.66	74	34.34	**PK**
2390	--	27.62	3.92	34.97	--	54	--	AV
Antenna Polarity: Horizontal								
2390	43.41	27.62	3.92	34.97	39.98	74	34.02	**PK**
2390	--	27.62	3.92	34.97	--	54	--	AV

Note:
1, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK
2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK
3, Result = Read level + Antenna factor + cable loss-Amp factor
4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.

π /4 DQPSK (CH High)

Band Edge Test result								
EUT: wireless Barcode scanner					M/N: DD18500			
Power: DC 3.7V from battery								
Test date: 2020-03-09		Test site: 3m Chamber			Tested by: Peter			
Test mode: Tx CH High 2480MHz								
Antenna polarity: Vertical								
Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2483.5	42.5	27.89	4	34.97	39.42	74	34.58	PK
2483.5	--	--	--	--	--	54	--	AV
Antenna Polarity: Horizontal								
2483.5	42.94	27.89	4	34.97	39.86	74	34.14	PK
2483.5	--	--	--	--	--	54	--	AV

Note:
1, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK
2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK
3, Result = Read level + Antenna factor + cable loss-Amp factor
4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.

π /4 DQPSK (Hopping Low)

Band Edge Test result								
EUT: wireless Barcode scanner M/N: DD18500								
Power: DC 3.7V from battery								
Test date: 2020-03-09 Test site: 3m Chamber Tested by: Peter								
Test mode:								
Antenna polarity: Vertical								
Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2390	43.09	27.62	3.92	34.97	39.66	74	34.34	**PK**
2390	--	27.62	3.92	34.97	--	54	--	AV
Antenna Polarity: Horizontal								
2390	43.05	27.62	3.92	34.97	39.62	74	34.38	**PK**
2390	--	27.62	3.92	34.97	--	54	--	AV

Note:
1, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK
2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK
3, Result = Read level + Antenna factor + cable loss-Amp factor
4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.

π/4 DQPSK (Hopping High)

Band Edge Test result								
EUT: wireless Barcode scanner M/N: DD18500								
Power: DC 3.7V from battery								
Test date: 2020-03-09 Test site: 3m Chamber Tested by: Peter								
Test mode: Tx								
Antenna polarity: Vertical								
Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2483.5	42.34	27.89	4	34.97	39.26	74	34.74	PK
2483.5	--	--	--	--	--	54	--	AV
Antenna Polarity: Horizontal								
2483.5	43.59	27.89	4	34.97	40.51	74	33.49	PK
2483.5	--	--	--	--	--	54	--	AV

Note:
1, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK
2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK
3, Result = Read level + Antenna factor + cable loss-Amp factor
4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.

8- DPSK (CH Low)

Band Edge Test result								
EUT: wireless Barcode scanner					M/N: DD18500			
Power: DC 3.7V from battery								
Test date: 2020-03-09 Test site: 3m Chamber Tested by: Peter								
Test mode: Tx CH Low 2402MHz								
Antenna polarity: Vertical								
Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2390	43.07	27.62	3.92	34.97	39.64	74	34.36	**PK**
2390	--	27.62	3.92	34.97	--	54	--	AV
Antenna Polarity: Horizontal								
2390	43.48	27.62	3.92	34.97	40.05	74	33.95	**PK**
2390	--	27.62	3.92	34.97	--	54	--	AV

Note:
1, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK
2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK
3, Result = Read level + Antenna factor + cable loss-Amp factor
4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.

8- DPSK (CH High)

Band Edge Test result								
EUT: wireless Barcode scanner M/N: DD18500								
Power: DC 3.7V from battery								
Test date: 2020-03-09 Test site: 3m Chamber Tested by: Peter								
Test mode: Tx CH High 2480MHz								
Antenna polarity: Vertical								
Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2483.5	42.32	27.89	4	34.97	39.24	74	34.76	**PK**
2483.5	--	--	--	--	--	54	--	AV
Antenna Polarity: Horizontal								
2483.5	43.67	27.89	4	34.97	40.59	74	33.41	**PK**
2483.5	--	--	--	--	--	54	--	AV

Note:
1, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK
2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK
3, Result = Read level + Antenna factor + cable loss-Amp factor
4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.

8- DPSK (Hopping Low)

Band Edge Test result								
EUT: wireless Barcode scanner M/N: DD18500								
Power: DC 3.7V from battery								
Test date: 2020-03-09 Test site: 3m Chamber Tested by: Peter								
Test mode: Tx								
Antenna polarity: Vertical								
Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2390	42.99	27.62	3.92	34.97	39.56	74	34.44	**PK**
2390	--	27.62	3.92	34.97	--	54	--	AV
Antenna Polarity: Horizontal								
2390	43.52	27.62	3.92	34.97	40.09	74	33.91	**PK**
2390	--	27.62	3.92	34.97	--	54	--	AV

Note:
1, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK
2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK
3, Result = Read level + Antenna factor + cable loss-Amp factor
4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.

8- DPSK (Hopping High)

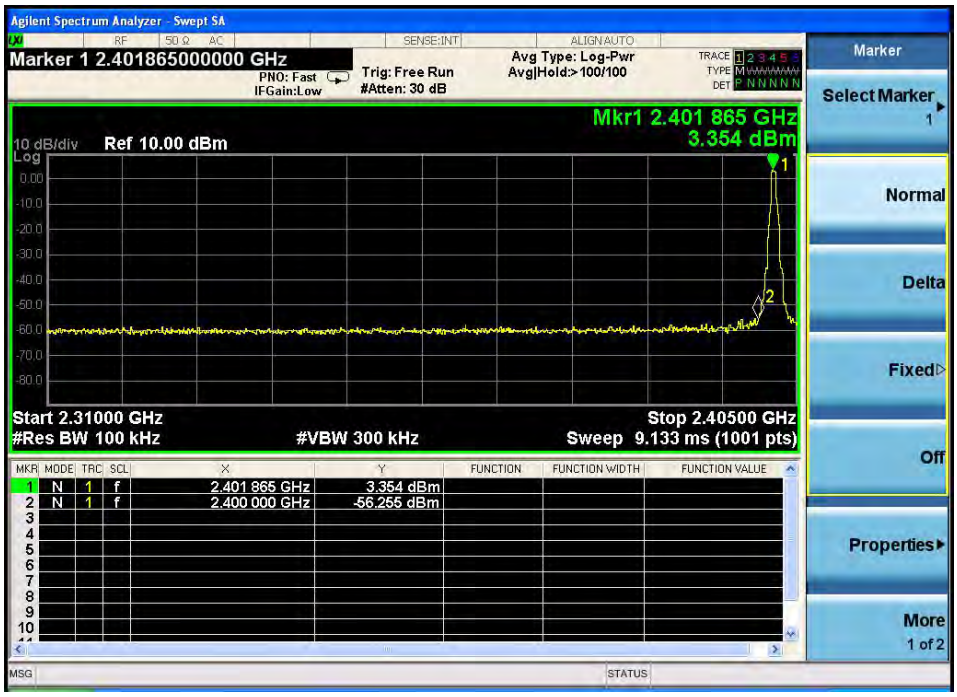
Band Edge Test result								
EUT: wireless Barcode scanner M/N: DD18500								
Power: DC 3.7V from battery								
Test date: 2020-03-09 Test site: 3m Chamber Tested by: Peter								
Test mode: Tx								
Antenna polarity: Vertical								
Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2483.5	42.41	27.89	4	34.97	39.33	74	34.67	PK
2483.5	--	--	--	--	--	54	--	AV
Antenna Polarity: Horizontal								
2483.5	43.12	27.89	4	34.97	40.04	74	33.96	PK
2483.5	--	--	--	--	--	54	--	AV

Note:
1, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK
2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK
3, Result = Read level + Antenna factor + cable loss-Amp factor
4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.

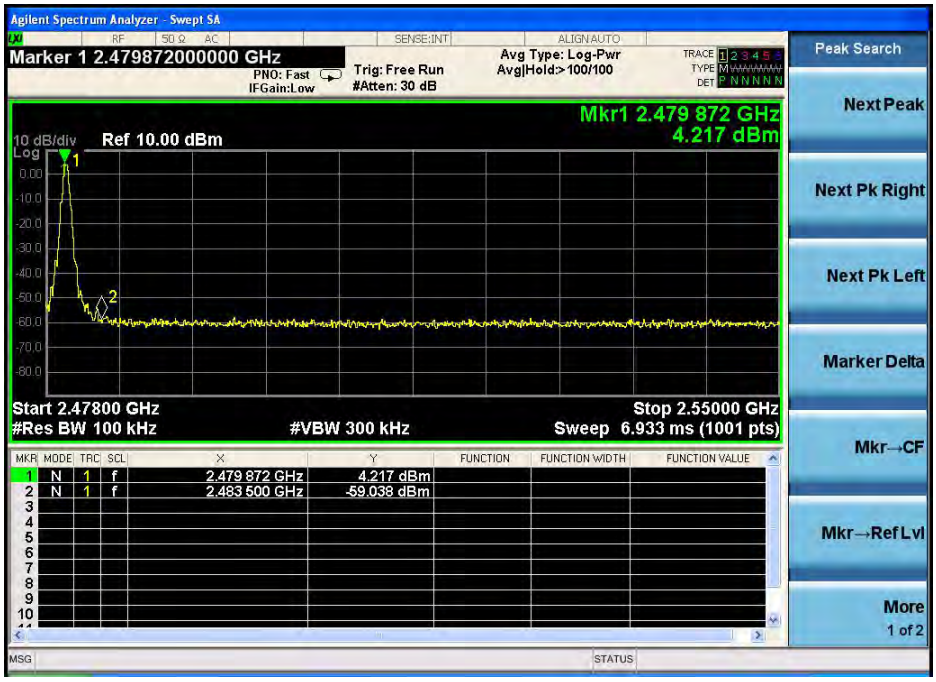
Conducted Method

GFSK

CH LOW :

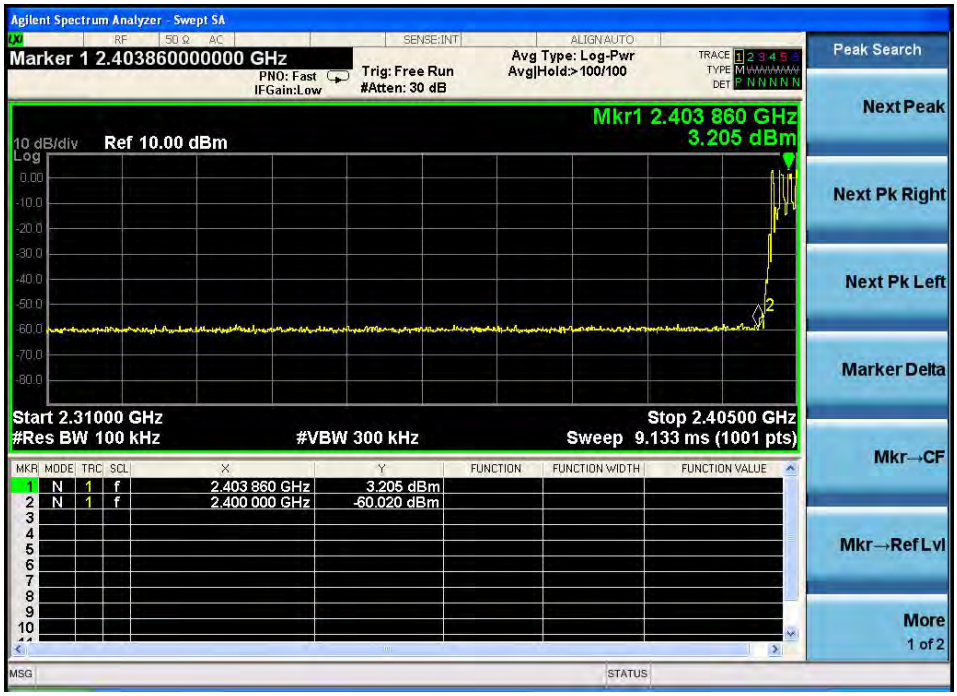


CH High :

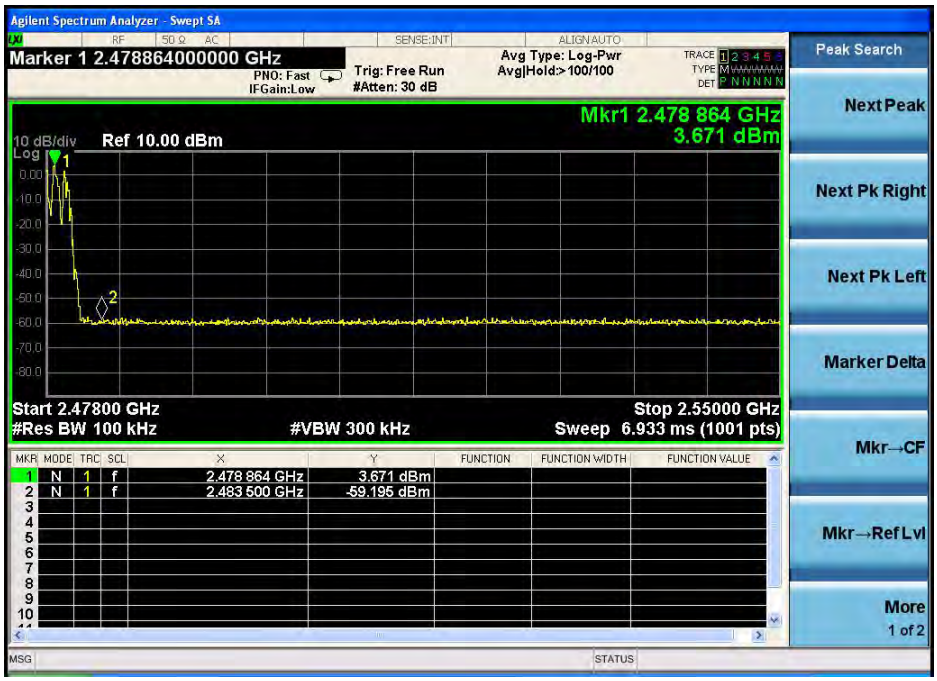


Hopping

Low

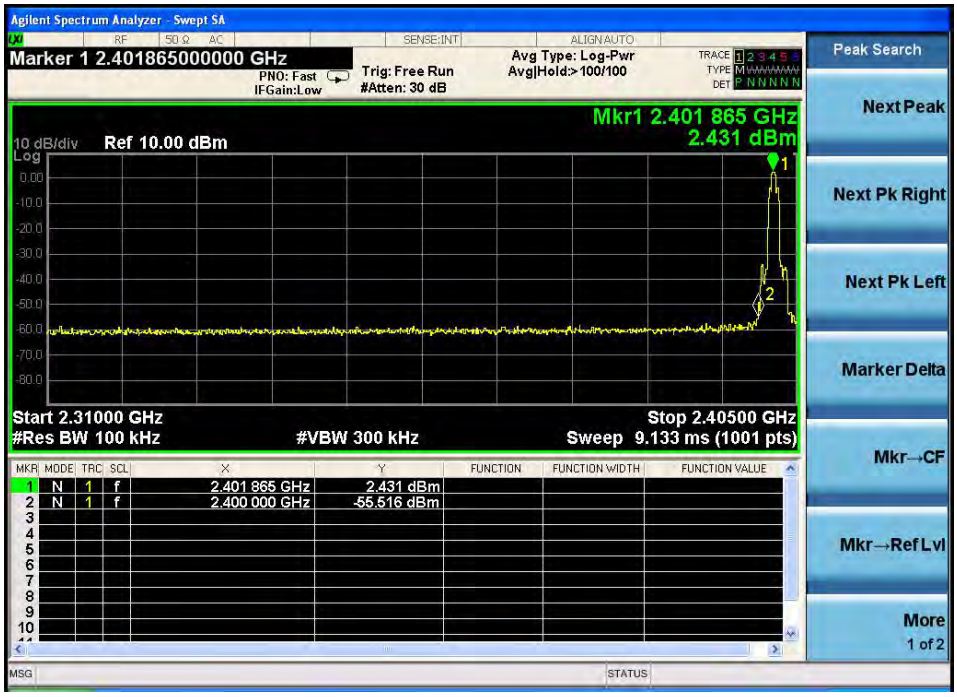


High



π /4 DQPSK

Low



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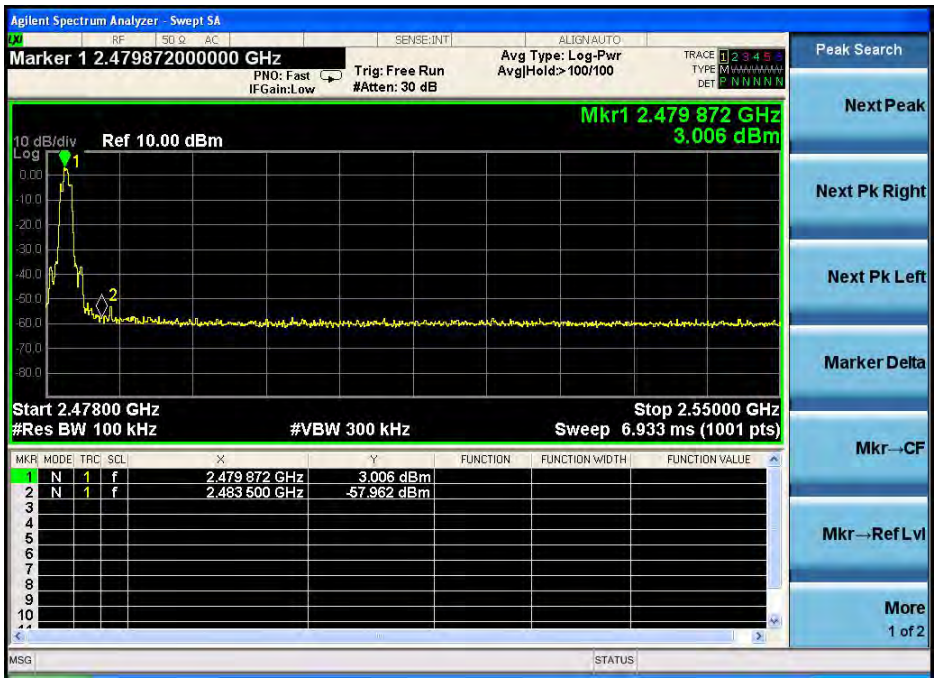

Hopping

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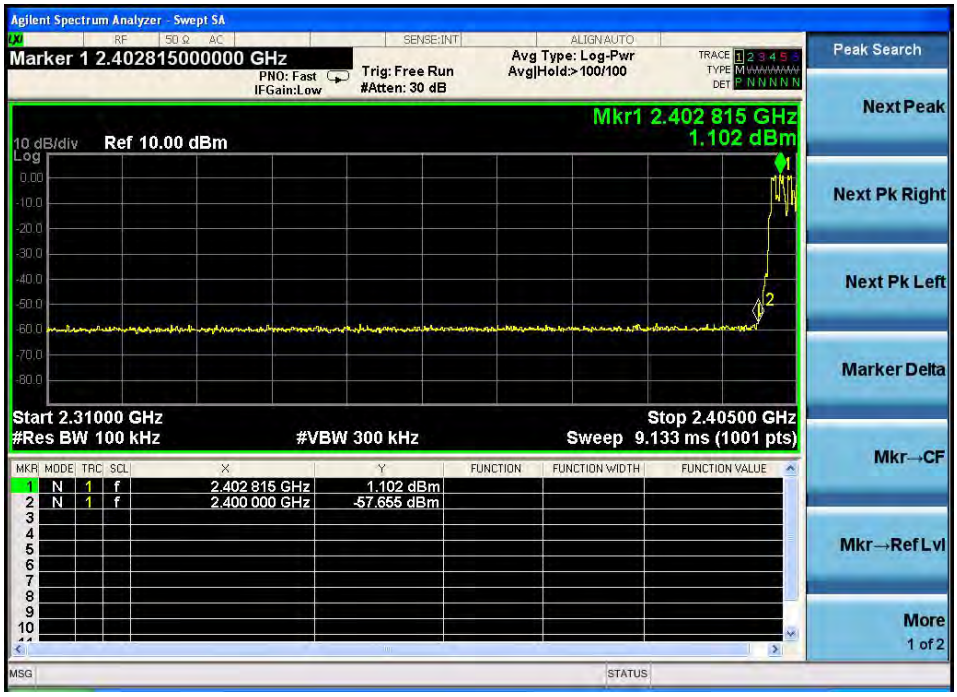

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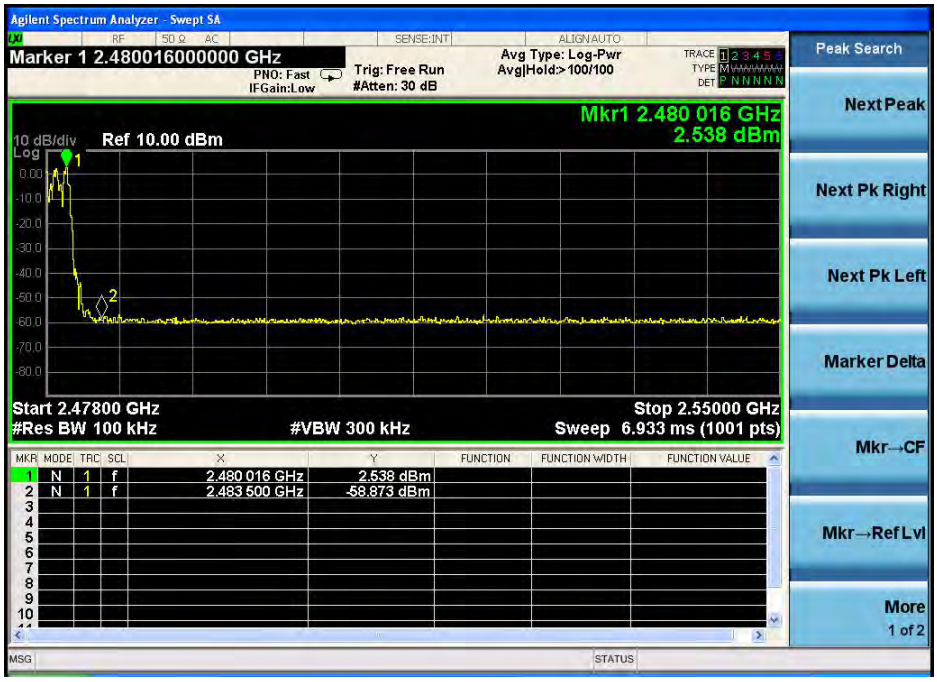
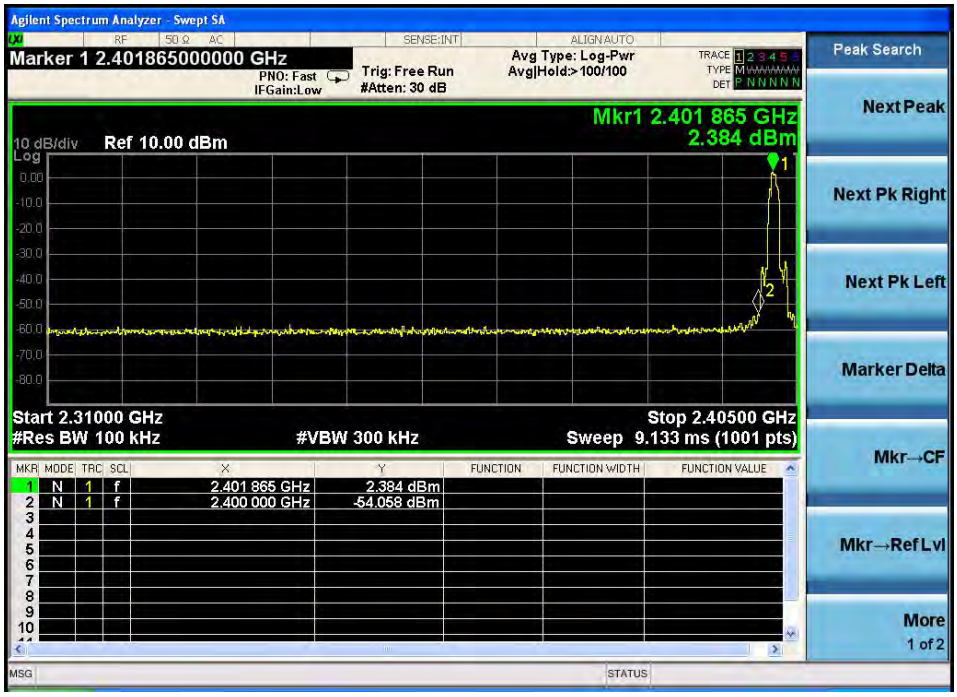


8- DPSK:

Low



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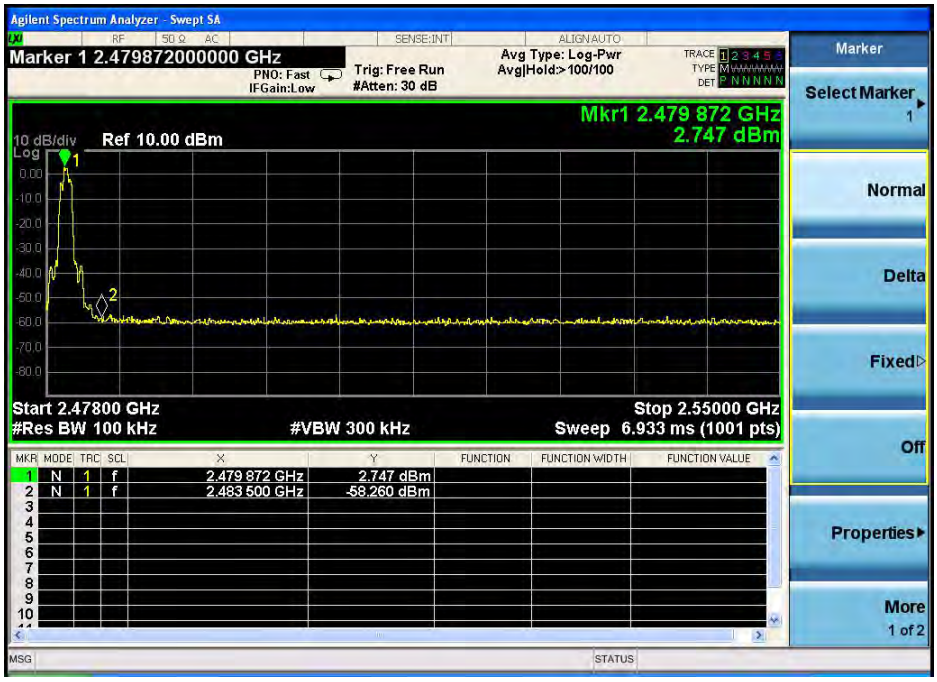
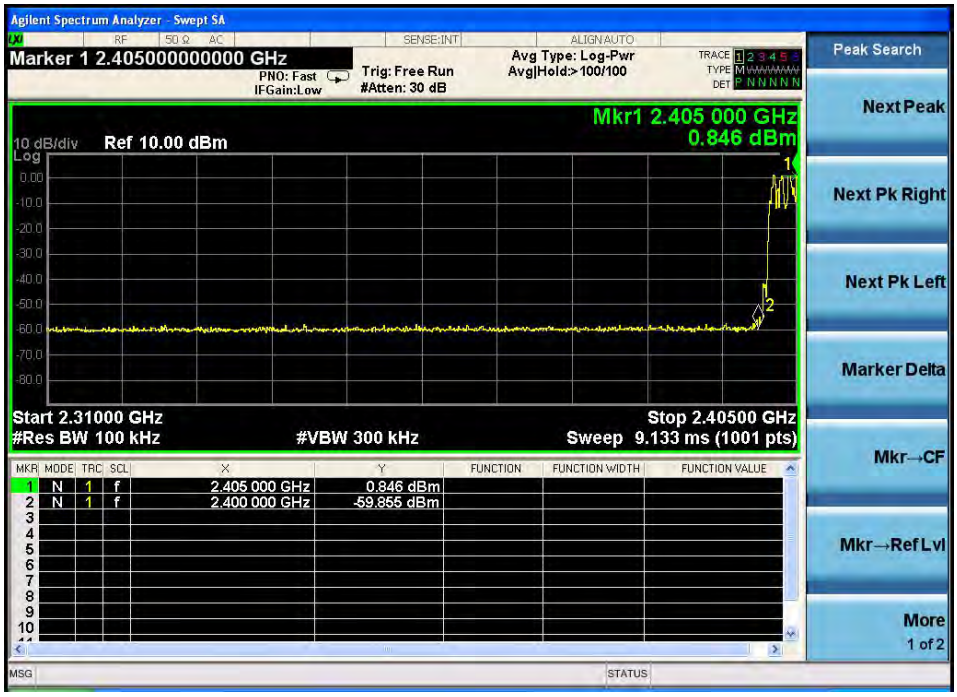
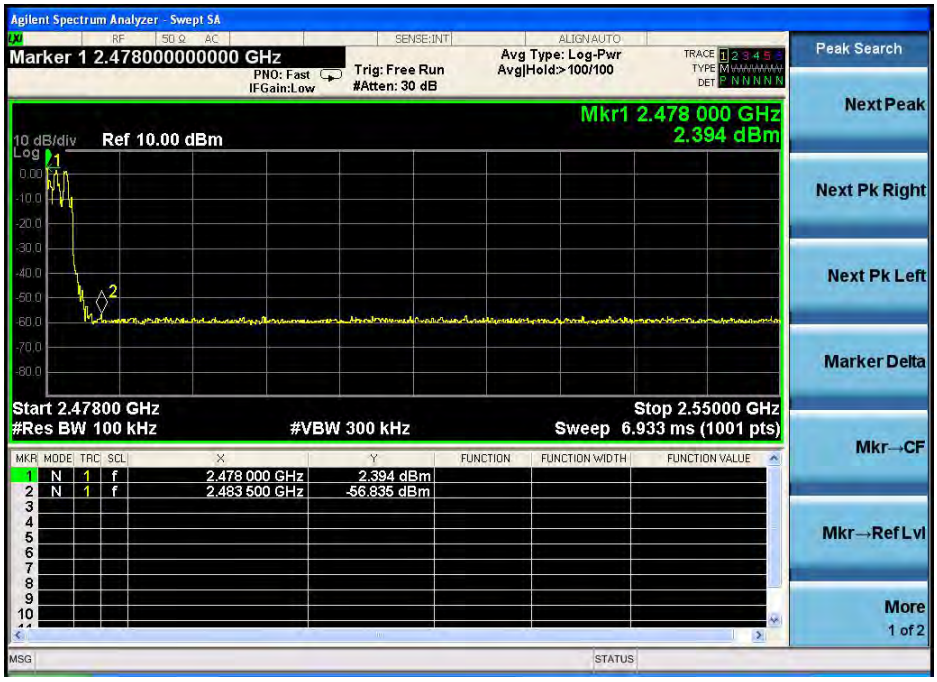


Hopping

Low

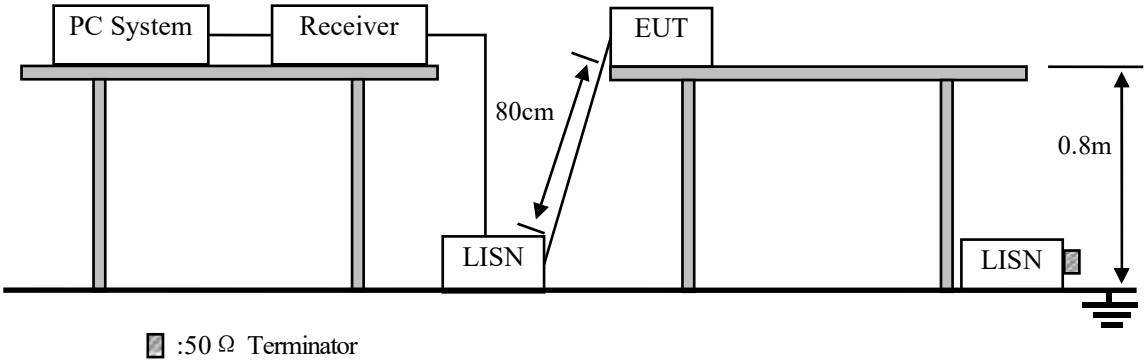


High



10. Power Line Conducted Emissions

10.1. Block Diagram of Test Setup



10.2. Limit

Frequency	Maximum RF Line Voltage	
	Quasi-Peak Level dB(μV)	Average Level dB(μV)
150kHz ~ 500kHz	66 ~ 56*	56 ~ 46*
500kHz ~ 5MHz	56	46
5MHz ~ 30MHz	60	50

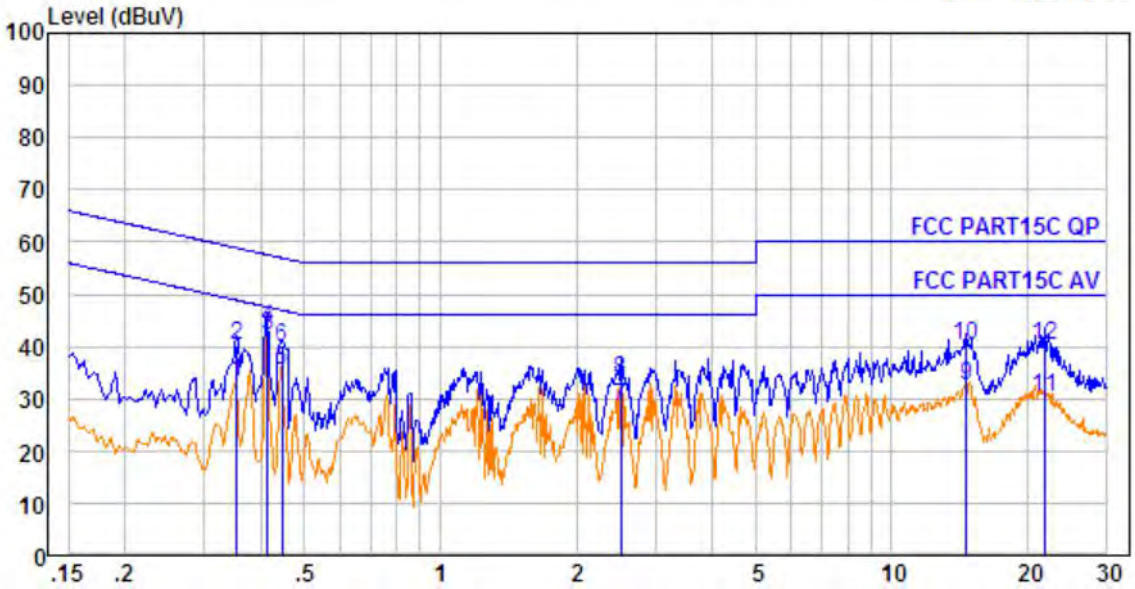
Notes: 1. * Decreasing linearly with logarithm of frequency.
2. The lower limit shall apply at the transition frequencies.

10.3. Test Procedure

(1) The EUT was placed on a non-metallic table, 80cm above the ground plane.
(2) Setup the EUT and simulator as shown in 10.1
(3) The EUT Power connected to the power mains through a power adapter and a line impedance stabilization network (L.I.S.N1). The other peripheral devices power cord connected to the power mains through a line impedance stabilization network (L.I.S.N2), this provided a 50-ohm coupling impedance for the EUT (Please refer to the block diagram of the test setup and photographs). Both sides of power line were checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to ANSI C63.10 2013 on conducted Emission test.
(4) The bandwidth of test receiver is set at 10KHz.
(5) The frequency range from 150 KHz to 30MHz is checked.

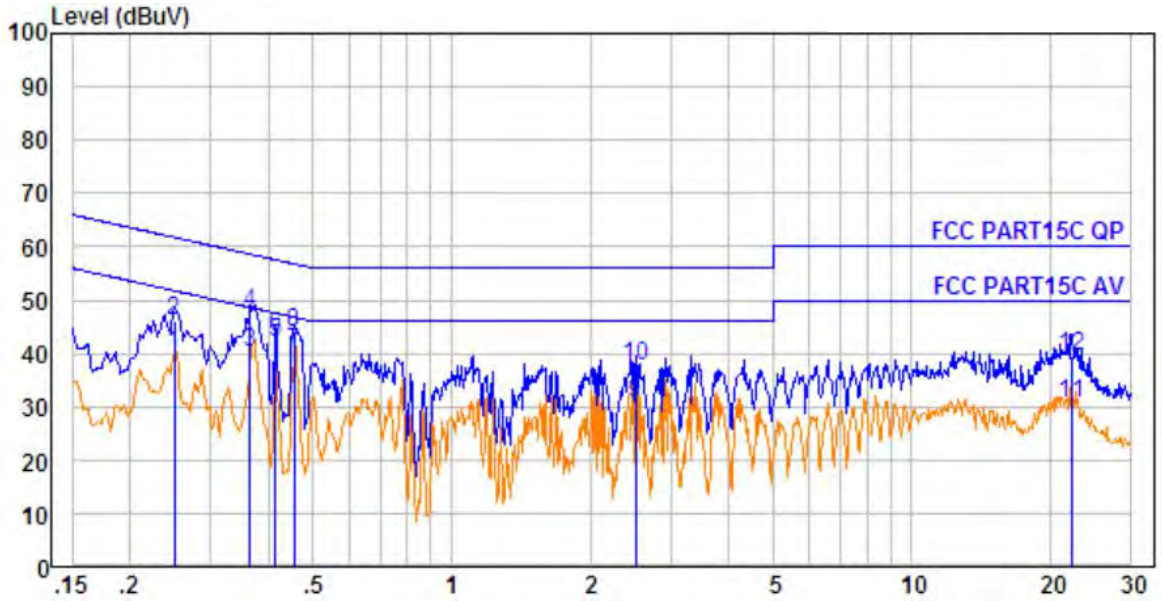
10.4. Test Result

LINE



No.	Freq MHz	Cable Loss dB	AMN Factor dB	Receiver Reading dBμV	Emission Level dBμV	Limit dBμV	Over Limit dB	Remark
1.	0.354	0.39	9.62	23.04	33.05	48.87	-15.82	Average
2.	0.354	0.39	9.62	30.35	40.36	58.87	-18.51	QP
3.	0.415	0.41	9.63	31.96	42.00	47.55	-5.55	Average
4.	0.415	0.41	9.63	33.64	43.68	57.55	-13.87	QP
5.	0.447	0.42	9.63	25.26	35.31	46.93	-11.62	Average
6.	0.447	0.42	9.63	29.67	39.72	56.93	-17.21	QP
7.	2.513	0.47	9.65	18.46	28.58	46.00	-17.42	Average
8.	2.513	0.47	9.65	23.61	33.73	56.00	-22.27	QP
9.	14.672	0.56	9.84	22.08	32.48	50.00	-17.52	Average
10.	14.672	0.56	9.84	29.85	40.25	60.00	-19.75	QP
11.	21.830	0.45	9.87	20.12	30.44	50.00	-19.56	Average
12.	21.830	0.45	9.87	29.99	40.31	60.00	-19.69	QP

NEUTRAL



No.	Freq MHz	Cable Loss dB	AMN Factor dB	Receiver Reading dBμV	Emission Level dBμV	Limit dBμV	Over Limit dB	Remark
1.	0.249	0.33	9.59	29.82	39.74	51.78	-12.04	Average
2.	0.249	0.33	9.59	36.14	46.06	61.78	-15.72	QP
3.	0.365	0.39	9.60	30.17	40.16	48.61	-8.45	Average
4.	0.365	0.39	9.60	37.65	47.64	58.61	-10.97	QP
5.	0.415	0.41	9.61	31.90	41.92	47.55	-5.63	Average
6.	0.415	0.41	9.61	33.06	43.08	57.55	-14.47	QP
7.	0.454	0.42	9.61	30.08	40.11	46.80	-6.69	Average
8.	0.454	0.42	9.61	33.80	43.83	56.80	-12.97	QP
9.	2.513	0.47	9.62	20.56	30.65	46.00	-15.35	Average
10.	2.513	0.47	9.62	27.43	37.52	56.00	-18.48	QP
11.	22.298	0.46	9.77	20.22	30.45	50.00	-19.55	Average
12.	22.298	0.46	9.77	29.16	39.39	60.00	-20.61	QP

11. Antenna Requirements

11.1. Limit

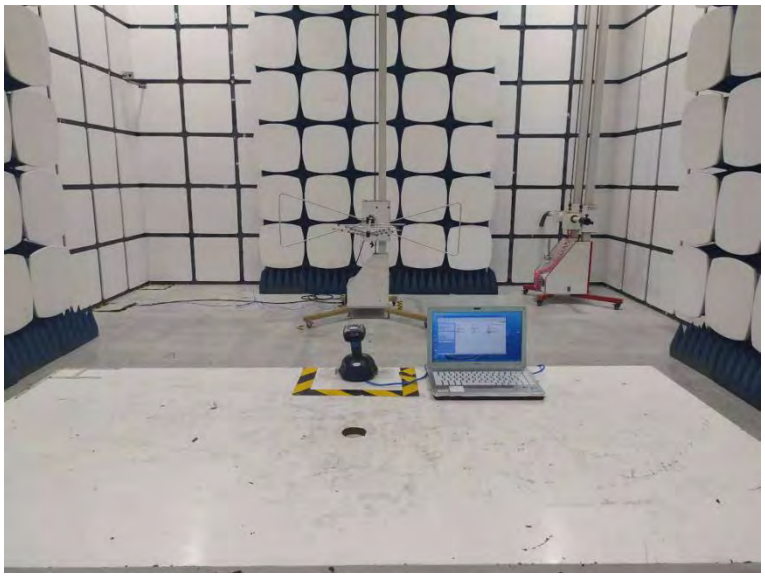
For intentional device, according to FCC Part 15, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC Part 15, if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

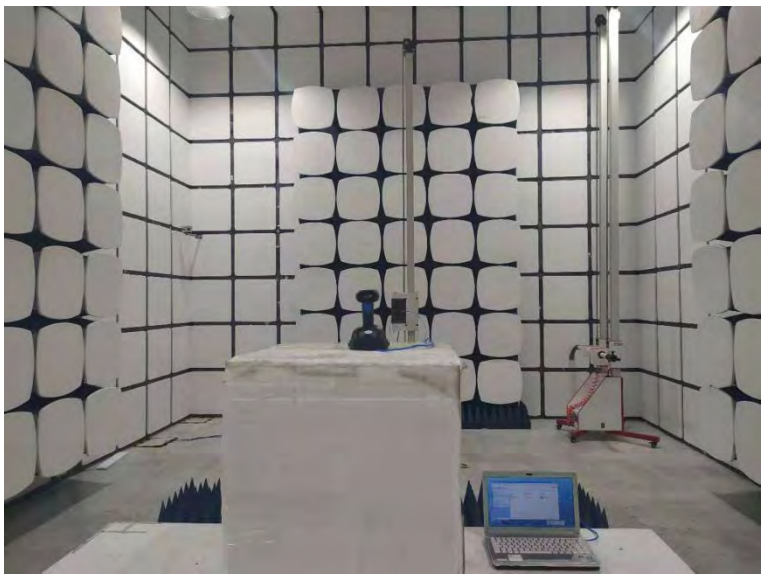
11.2. Result

The antennas used for this product are PCB Antenna for Bluetooth, no antenna other than that furnished by the responsible party shall be used with the device, the maximum peak gain of the transmit antenna is only 0dBi .

12. Test setup photo

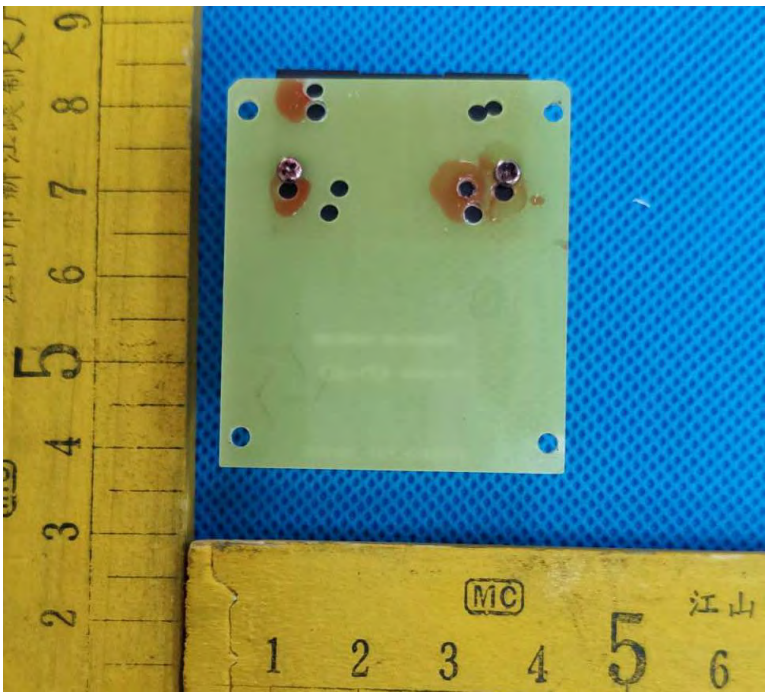
Photographs-Radiated Emission Test Setup in Chamber

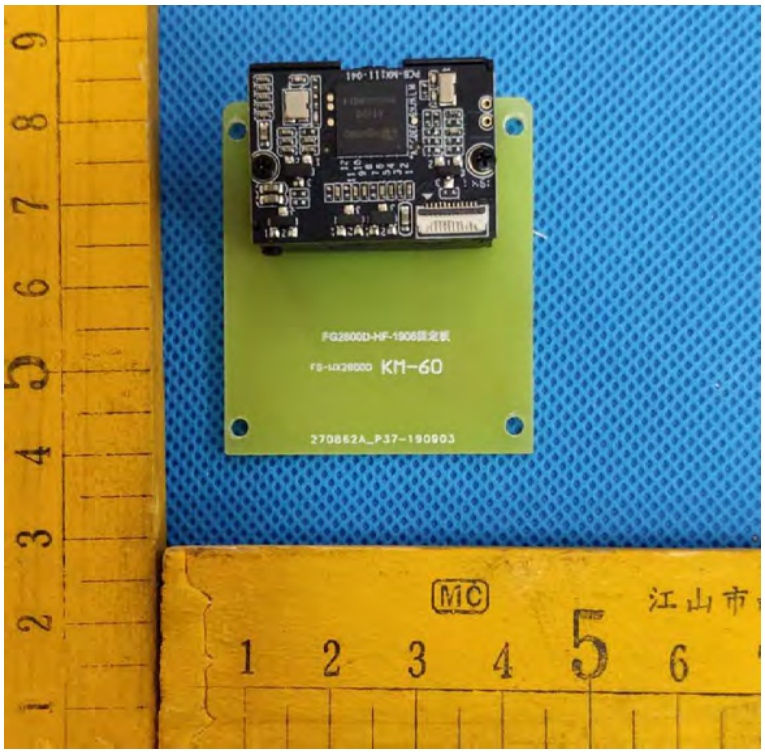


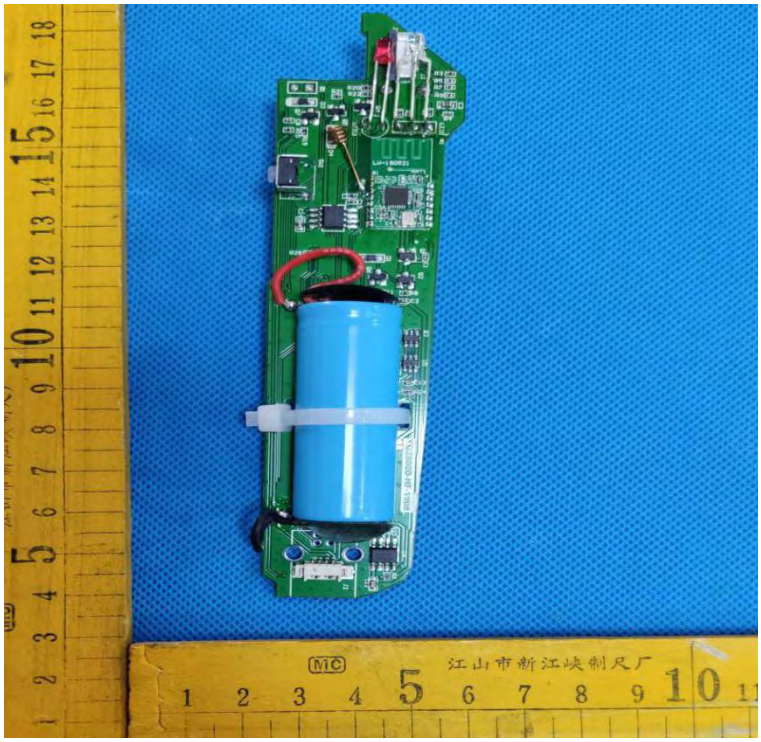


Photos of conducted emission

13. Photos of EUT


MC
江山


KM-60
270862A_P37-190903
MC
江山市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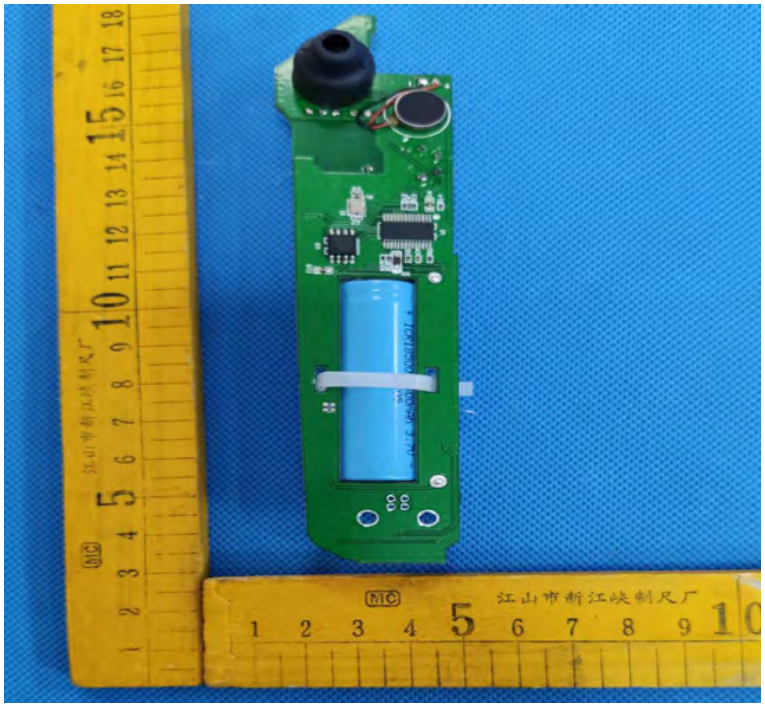
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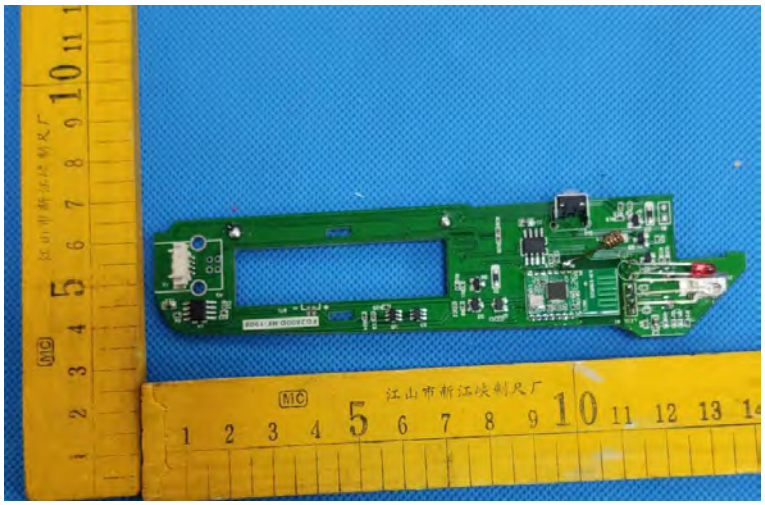
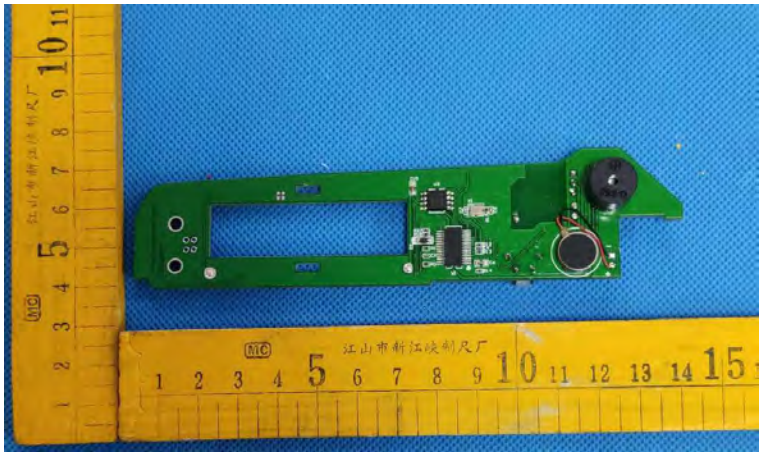
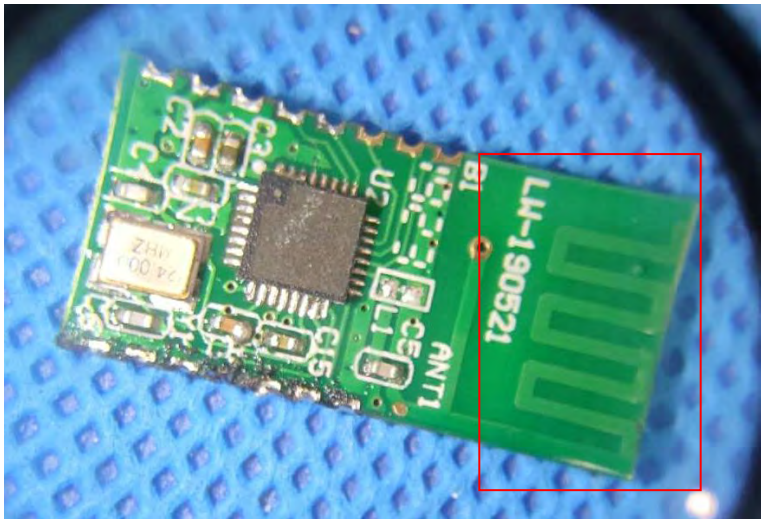
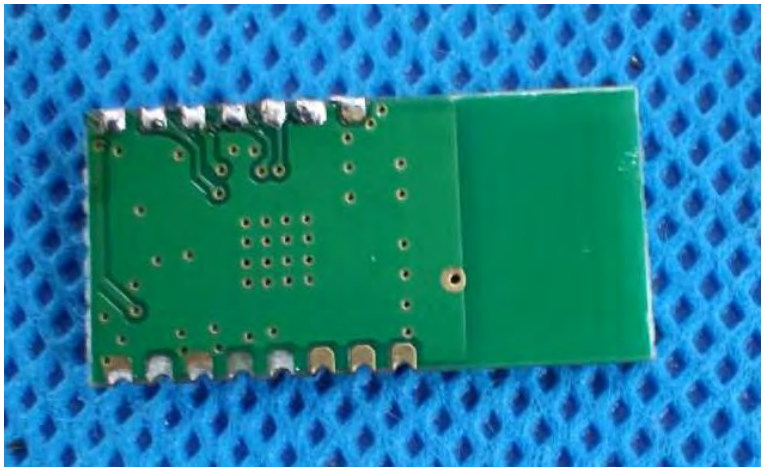






ANTENNA



-------END OF THE REPORT-------