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TEST REPORT

FCC PART 15.247

Report Reference No.: CTL1712228031-WF01

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Ivan Xie

Product Name.....: Bluetooth Speaker

Model/Type reference: D MATE

List Model(s).....: N/A

Trade Mark.....: DOCKIN

FCC ID.....: 2AONQ-BT519

Applicant's name: Stroer Products GmbH

Address of applicant: Torstr. 49, 10119 Berlin, Germany

Test Firm.....: Shenzhen CTL Testing Technology Co., Ltd.

Address of Test Firm.....: Floor 1-A, Baisha Technology Park, No.3011, Shahexi Road,
Nanshan District, Shenzhen, China 518055

Test specification.....:

Standard.....: FCC Part 15.247: Operation within the bands 902-928 MHz,
2400-2483.5 MHz and 5725-5850 MHz.

TRF Originator.....: Shenzhen CTL Testing Technology Co., Ltd.

Master TRF.....: Dated 2011-01

Date of Receipt.....: Dec. 22, 2017

Date of Test Date.....: Jan. 18, 2018–Jan. 29, 2018

Data of Issue.....: Jan. 29, 2018

Result.....: Pass

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TEST REPORT

Test Report No. : CTL1712228031-WF01	Jan. 29, 2018 ----- Date of issue
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Equipment under Test : Bluetooth Speaker

Model /Type : D MATE

Listed Models : N/A

Applicant : **Stroer Products GmbH**

Address : Torstr. 49, 10119 Berlin, Germany

Manufacturer : **SHENZHEN WEIKING TECHNOLOGY CO.,LTD**

Address : W-king Technology Park, NO.431, Huating Road,
Dalang Street, Longhua Town, Baoan District,
Shenzhen City, China

Test result	Pass *
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*In the configuration tested, the EUT complied with the standards specified page 5.

The test report merely corresponds to the test sample.

It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

**** Modified History ****

Revisions	Description	Issued Data	Report No.	Remark
Version 1.0	Initial Test Report Release	2018-01-29	CTL1712228031-WF01	Tracy Qi



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1. SUMMARY

1.1. TEST STANDARDS

The tests were performed according to following standards:

[FCC Rules Part 15.247](#): Frequency Hopping, Direct Spread Spectrum and Hybrid Systems that are in operation within the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz

[ANSI C63.10: 2013](#): American National Standard for Testing Unlicensed Wireless Devices

[ANSI C63.4: 2014](#): –American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40GHz
Range of 9 kHz to 40GHz

[KDB558074 D01 V03r03](#): Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247

1.2. Test Description

FCC PART 15.247		
FCC Part 15.207	AC Power Conducted Emission	PASS
FCC Part 15.247(a)(1)(i)	20dB Bandwidth	PASS
FCC Part 15.247(d)	Spurious RF Conducted Emission	PASS
FCC Part 15.247(b)	Maximum Peak Output Power	PASS
FCC Part 15.247(b)	Pseudorandom Frequency Hopping Sequence	PASS
FCC Part 15.247(a)(1)(iii)	Number of hopping frequency& Time of Occupancy	PASS
FCC Part 15.247(a)(1)	Frequency Separation	PASS
FCC Part 15.205/15.209	Radiated Emissions	PASS
FCC Part 15.247(d)	Band Edge Compliance of RF Emission	PASS
FCC Part 15.203/15.247 (b)	Antenna Requirement	PASS

1.3. Test Facility

1.3.1 Address of the test laboratory

Shenzhen CTL Testing Technology Co., Ltd.

Floor 1-A, Baisha Technology Park, No. 3011, Shahexi Road, Nanshan, Shenzhen 518055 China

There is one 3m semi-anechoic chamber and two line conducted labs for final test. The Test Sites meet the requirements in documents ANSI C63.4 and CISPR 32/EN 55032 requirements.

1.3.2 Laboratory accreditation

The test facility is recognized, certified, or accredited by the following organizations:

IC Registration No.: 9618B

The 3m alternate test site of Shenzhen CTL Testing Technology Co., Ltd. EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration No.: 9618B on November 13, 2013.

FCC-Registration No.: 399832

Shenzhen CTL Testing Technology Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 399832, December 08, 2017.

1.4. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 "Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements" and is documented in the Shenzhen CTL Testing Technology Co., Ltd. quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for CTL laboratory is reported:

Test	Measurement Uncertainty	Notes
Transmitter power conducted	±0.57 dB	(1)
Transmitter power Radiated	±2.20 dB	(1)
Conducted spurious emission 9KHz-40 GHz	±2.20 dB	(1)
Occupied Bandwidth	±0.01ppm	(1)
Radiated Emission 30~1000MHz	±4.10dB	(1)
Radiated Emission Above 1GHz	±4.32dB	(1)
Conducted Disturbance0.15~30MHz	±3.20dB	(1)

- (1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

2. GENERAL INFORMATION

2.1. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Normal Temperature:	25°C
Relative Humidity:	55 %
Air Pressure:	101 kPa

2.2. General Description of EUT

Product Name:	Bluetooth Speaker
Model/Type reference:	D MATE
Power supply:	DC 7.26V from battery
Bluetooth :	
Supported type:	Bluetooth 4.2
Modulation:	GFSK, $\pi/4$ DQPSK, 8DPSK
Operation frequency:	2402MHz~2480MHz
Channel number:	79
Channel separation:	1MHz
Antenna type:	Integrated antenna
Antenna gain:	2.53dBi

Note: For more details, please refer to the user's manual of the EUT.

2.3. Description of Test Modes and Test Frequency

The Applicant provides communication tools software to control the EUT for staying in continuous transmitting (Duty Cycle more than 98%) and receiving mode for testing .There are 79 channels provided to the EUT and Channel 00/39/78 were selected to test.

Operation Frequency :

Channel	Frequency (MHz)
00	2402
01	2403
:	:
38	2440
39	2441
40	2442
:	:
77	2479
78	2480

Preliminary tests were performed in each mode and packet length of BT, and found worst case as below, finally test were conducted at those mode and recorded in this report.

Test Items	Worst case
Conducted Emissions	DH5 Middle channel
Radiated Emissions and Band Edge	DH5
Maximum Conducted Output Power	DH5/2DH5/3DH5
20dB Bandwidth	DH5/2DH5/3DH5
Frequency Separation	DH5/2DH5/3DH5 Middle channel
Number of hopping frequency	DH5/2DH5/3DH5
Time of Occupancy (Dwell Time)	DH1/DH3/DH5 Middle channel 2DH1/2DH3/2DH5 Middle channel 3DH1/3DH3/3DH5 Middle channel
Out-of-band Emissions	DH5/2DH5/3DH5

2.4. Equipments Used during the Test

Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
LISN	R&S	ENV216	3560.6550.1 2	2017/06/02	2018/06/01
LISN	R&S	ESH2-Z5	860014/010	2017/06/02	2018/06/01
Bilog Antenna	Sunol Sciences Corp.	JB1	A061713	2017/06/02	2018/06/01
EMI Test Receiver	R&S	ESCI	103710	2017/06/02	2018/06/01
Spectrum Analyzer	Agilent	E4407B	MY41440676	2017/05/21	2018/05/20
Spectrum Analyzer	Agilent	N9020	US46220290	2018/01/15	2019/01/14
Controller	EM Electronics	Controller EM 1000	N/A	2017/05/21	2018/05/20
Horn Antenna	Sunol Sciences Corp.	DRH-118	A062013	2017/05/19	2018/05/18
Active Loop Antenna	SCHWARZBECK	FMZB1519	1519-037	2017/05/19	2018/05/18
Amplifier	Agilent	8449B	3008A02306	2017/05/19	2018/05/18
Amplifier	Agilent	8447D	2944A10176	2017/05/19	2018/05/18
Temperature/Humidity Meter	Gangxing	CTH-608	02	2017/05/20	2018/05/19
High-Pass Filter	K&L	9SH10-2700/X1 2750-O/O	N/A	2017/05/20	2018/05/19
High-Pass Filter	K&L	41H10-1375/U1 2750-O/O	N/A	2017/05/20	2018/05/19
Coaxial Cables	HUBER+SUHNER	SUCOFLEX 104PEA-10M	10m	2017/06/02	2018/06/01
Coaxial Cables	HUBER+SUHNER	SUCOFLEX 104PEA-3M	3m	2017/06/02	2018/06/01
Coaxial Cables	HUBER+SUHNER	SUCOFLEX 104PEA-3M	3m	2017/06/02	2018/06/01

RF Cable	Megalon	RF-A303	N/A	2017/06/02	2018/06/01
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The calibration interval was one year

2.5. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended to comply with Section 15.247 of the FCC Part 15, Subpart C Rules.

2.6. Modifications

No modifications were implemented to meet testing criteria.



3. TEST CONDITIONS AND RESULTS

3.1. Conducted Emissions Test

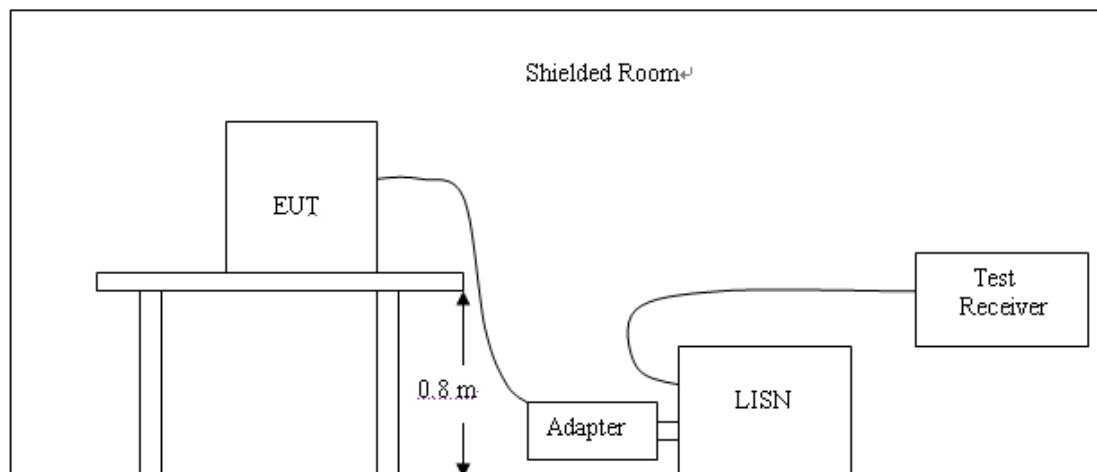
LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.207

Frequency range (MHz)	Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

TEST CONFIGURATION



TEST PROCEDURE

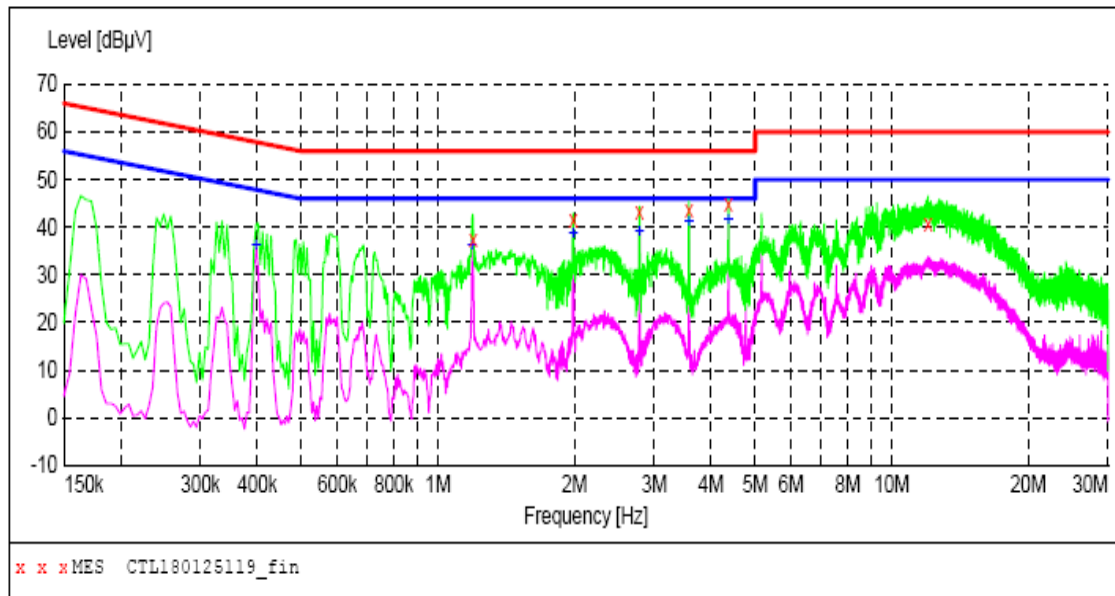
1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system; a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10:2013.
2. Support equipment, if needed, was placed as per ANSI C63.10:2013.
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10:2013.
4. The adapter received AC120V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
5. All support equipments received AC power from a second LISN, if any.
6. The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7. Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.
8. During the above scans, the emissions were maximized by cable manipulation.

TEST RESULTS

Remark: All modes of GFSK, Pi/4 DQPSK, and 8DPSK were test at Low, Middle, and High channel; only the worst result of GFSK Middle Channel was reported as below:

SCAN TABLE: "Voltage (9K-30M)FIN"

Short Description: 150K-30M Voltage

**MEASUREMENT RESULT: "CTL180125119_fin"**

25/01/2018 14:19

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
1.196000	37.30	10.3	56	18.7	QP	L1	GND
1.988000	41.70	10.3	56	14.3	QP	L1	GND
2.780000	43.00	10.4	56	13.0	QP	L1	GND
3.578000	43.60	10.4	56	12.4	QP	L1	GND
4.370000	44.70	10.4	56	11.3	QP	L1	GND
12.032000	40.90	10.6	60	19.1	QP	L1	GND

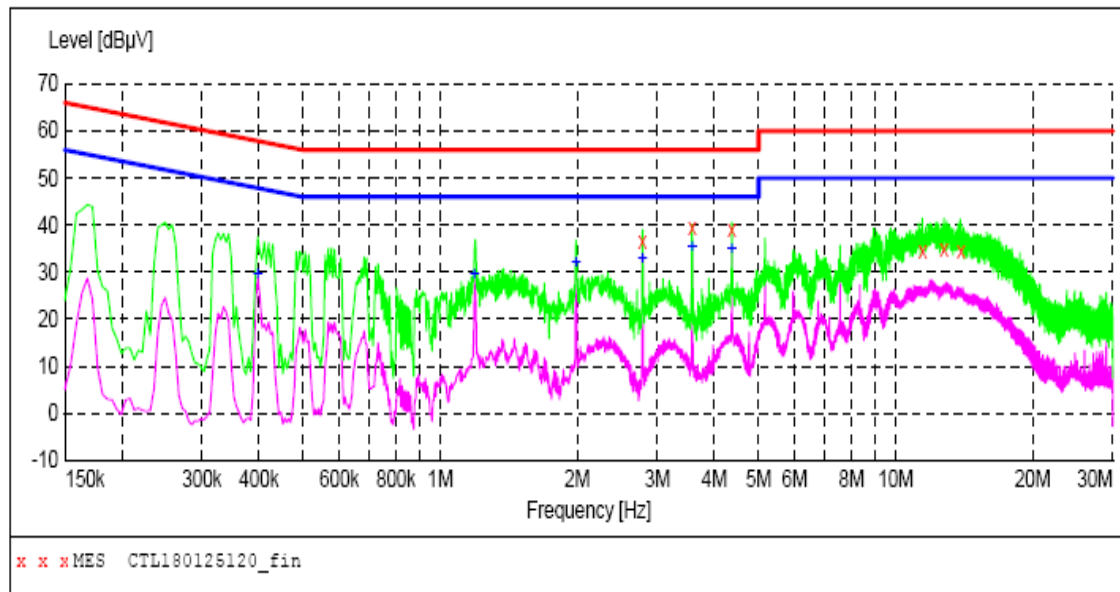
MEASUREMENT RESULT: "CTL180125119_fin2"

25/01/2018 14:19

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.398000	36.10	10.2	48	11.8	AV	L1	GND
1.190000	36.20	10.3	46	9.8	AV	L1	GND
1.988000	38.50	10.3	46	7.5	AV	L1	GND
2.780000	39.00	10.4	46	7.0	AV	L1	GND
3.578000	41.20	10.4	46	4.8	AV	L1	GND
4.370000	41.40	10.4	46	4.6	AV	L1	GND

SCAN TABLE: "Voltage (9K-30M)FIN"

Short Description: 150K-30M Voltage

**MEASUREMENT RESULT: "CTL180125120_fin"**

25/01/2018 14:22

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
2.780000	36.60	10.4	56	19.4	QP	N	GND
3.578000	39.30	10.4	56	16.7	QP	N	GND
4.370000	39.00	10.4	56	17.0	QP	N	GND
11.462000	34.40	10.6	60	25.6	QP	N	GND
12.776000	34.90	10.6	60	25.1	QP	N	GND
13.916000	34.50	10.6	60	25.5	QP	N	GND

MEASUREMENT RESULT: "CTL180125120_fin2"

25/01/2018 14:22

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.398000	29.30	10.2	48	18.6	AV	N	GND
1.190000	29.30	10.3	46	16.7	AV	N	GND
1.988000	32.20	10.3	46	13.8	AV	N	GND
2.780000	32.70	10.4	46	13.3	AV	N	GND
3.578000	35.30	10.4	46	10.7	AV	N	GND
4.370000	34.70	10.4	46	11.3	AV	N	GND

3.2. Radiated Emissions and Band Edge

Limit

For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emission out of authorized band shall not exceed the following table at a 3 meters measurement distance.

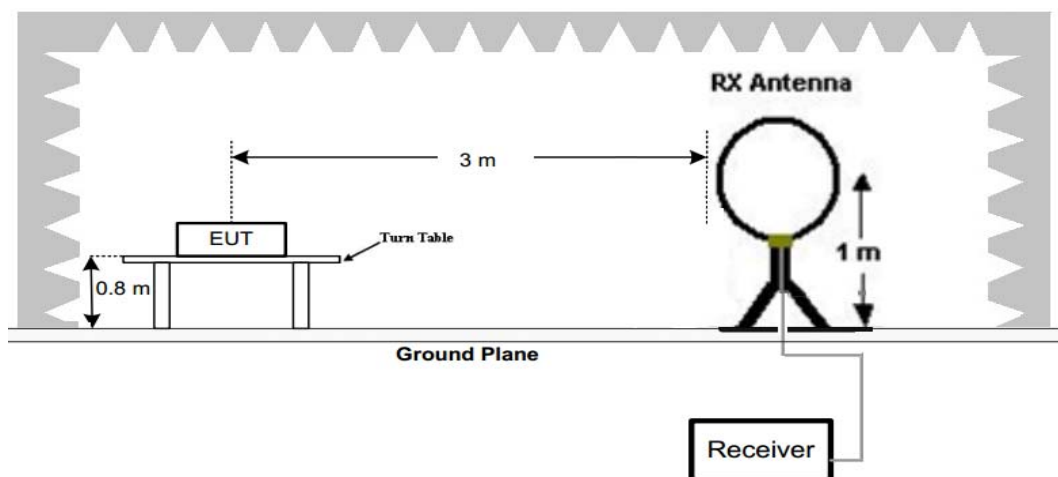
In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a)

Radiated emission limits

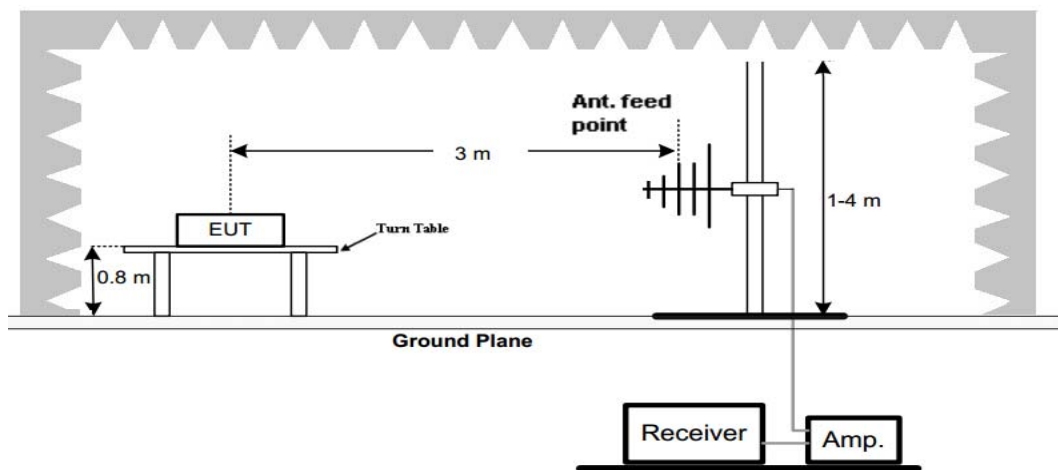
Frequency (MHz)	Distance (Meters)	Radiated (dBμV/m)	Radiated (μV/m)
0.009-0.49	3	$20\log(2400/F(\text{KHz}))+40\log(300/3)$	$2400/F(\text{KHz})$
0.49-1.705	3	$20\log(24000/F(\text{KHz}))+40\log(30/3)$	$24000/F(\text{KHz})$
1.705-30	3	$20\log(30)+40\log(30/3)$	30
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

TEST CONFIGURATION

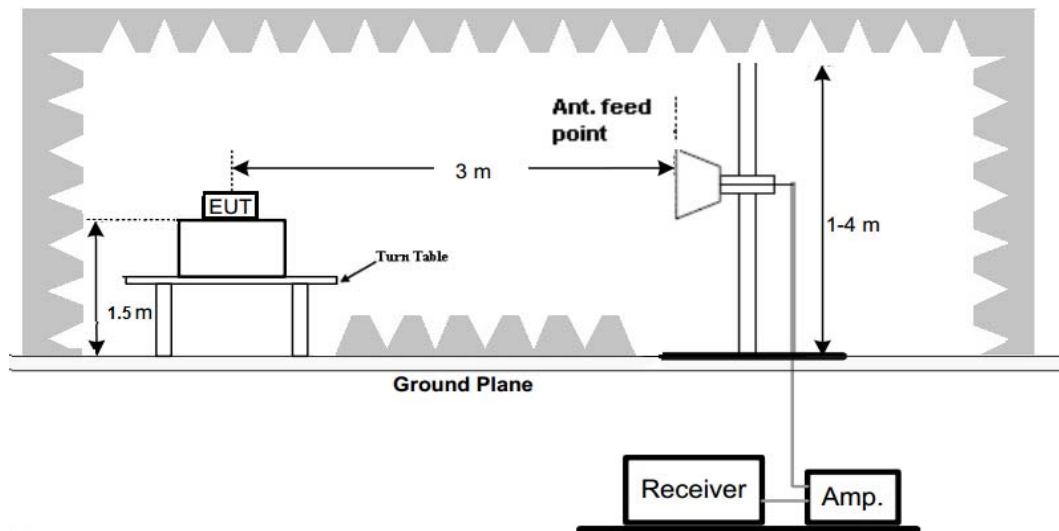
(A) Radiated Emission Test Set-Up, Frequency Below 30MHz



(B) Radiated Emission Test Set-Up, Frequency below 1000MHz



(C) Radiated Emission Test Set-Up, Frequency above 1000MHz



Test Procedure

1. Below 1GHz measurement the EUT is placed on a turntable which is 0.8m above ground plane, and above 1GHz measurement EUT was placed on a low permittivity and low loss tangent turn table which is 1.5m above ground plane.
2. Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0° to 360° to acquire the highest emissions from EUT
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measurements have been completed.

TEST RESULTS

Remark:

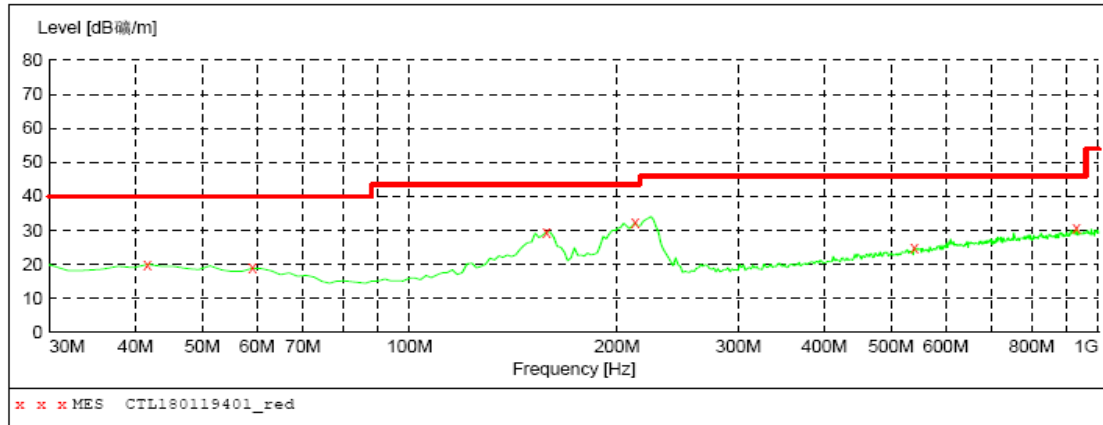
1. We measured Radiated Emission at GFSK, $\pi/4$ DQPSK and 8DPSK mode from 9 KHz to 25GHz and recorded worst case at GFSK DH5 mode.
2. For below 1GHz testing recorded worst at GFSK DH5 low channel.
3. Radiated emission test from 9 KHz to 10th harmonic of fundamental was verified, and no emission found except system noise floor in 9 KHz to 30MHz and not recorded in this report.

For 30MHz-1GHz

Horizontal

SWEEP TABLE: "test (30M-1G)"

Short Description:		Field Strength			
Start	Stop	Detector	Meas.	IF	Transducer
Frequency	Frequency		Time	Bandw.	
30.0 MHz	1.0 GHz	MaxPeak	300.0 ms	100 kHz	VULB 9168

**MEASUREMENT RESULT: "CTL180119401_red"**

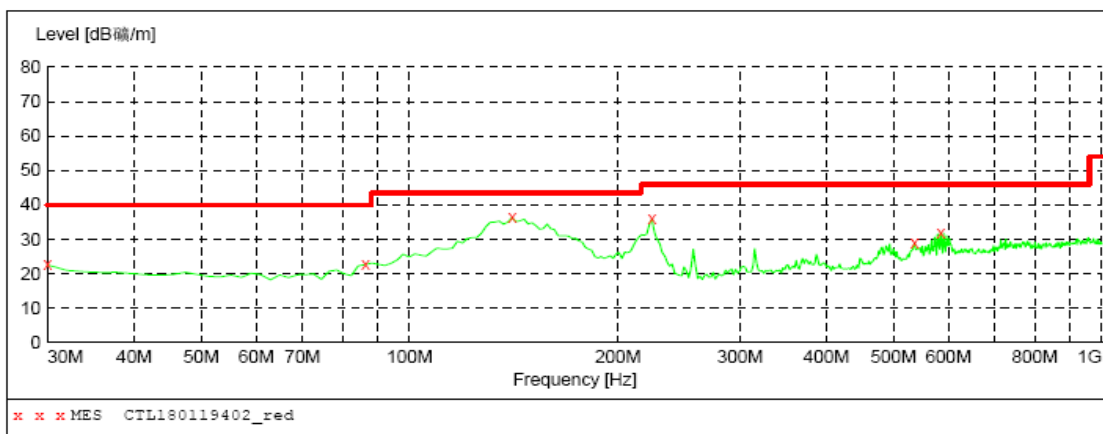
2018-1-19 9:04

Frequency MHz	Level dB/m	Transd dB	Limit dB/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
41.640000	20.00	15.6	40.0	20.0	---	0.0	0.00	HORIZONTAL
59.100000	18.90	14.4	40.0	21.1	---	0.0	0.00	HORIZONTAL
158.040000	29.50	16.2	43.5	14.0	---	0.0	0.00	HORIZONTAL
212.360000	32.20	12.4	43.5	11.3	---	0.0	0.00	HORIZONTAL
540.220000	24.80	20.1	46.0	21.2	---	0.0	0.00	HORIZONTAL
928.220000	30.40	25.3	46.0	15.6	---	0.0	0.00	HORIZONTAL

Vertical

SWEEP TABLE: "test (30M-1G)"

Short Description:		Field Strength			
Start	Stop	Detector	Meas.	IF	Transducer
Frequency	Frequency		Time	Bandw.	
30.0 MHz	1.0 GHz	MaxPeak	300.0 ms	100 kHz	VULB 9168

**MEASUREMENT RESULT: "CTL180119402_red"**

2018-1-19 9:07

Frequency MHz	Level dB/m	Transd dB	Limit dB/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
30.000000	22.60	14.8	40.0	17.4	---	0.0	0.00	VERTICAL
86.260000	22.70	11.2	40.0	17.3	---	0.0	0.00	VERTICAL
140.580000	36.40	15.5	43.5	7.1	---	0.0	0.00	VERTICAL
224.000000	36.00	13.1	46.0	10.0	---	0.0	0.00	VERTICAL
536.340000	28.80	20.0	46.0	17.2	---	0.0	0.00	VERTICAL
584.840000	32.00	20.9	46.0	14.0	---	0.0	0.00	VERTICAL

For 1GHz to 25GHz

Note: GFSK, Pi/4 DQPSK and 8DPSK all have been tested, only worse case GFSK is reported.

GFSK (above 1GHz)

Frequency(MHz):			2402		Polarity:			HORIZONTAL	
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
4804.00	55.04	PK	74	18.96	50.53	33.49	6.91	35.89	4.51
4804.00	46.47	AV	54	7.53	41.96	33.49	6.91	35.89	4.51
6173.40	44.79	PK	74	29.21	36.41	35.19	7.86	34.67	8.38
6173.40	--	AV	54	--	--	--	--	--	--
7206.00	45.24	PK	74	28.76	34.13	36.95	9.18	35.03	11.11
7206.00	--	AV	54	--	--	--	--	--	--

Frequency(MHz):			2402		Polarity:			VERTICAL	
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
4804.00	56.57	PK	74	17.43	52.06	33.49	6.91	35.89	4.51
4804.00	47.52	AV	54	6.48	43.01	33.49	6.91	35.89	4.51
5804.25	44.09	PK	74	29.91	36.33	34.80	7.48	34.52	7.76
5804.25	--	AV	54	--	--	--	--	--	--
7206.00	46.32	PK	74	27.68	35.21	36.95	9.18	35.03	11.11
7206.00	--	AV	54	--	--	--	--	--	--

Frequency(MHz):			2441		Polarity:			HORIZONTAL	
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
4882.00	56.22	PK	74	17.78	51.57	33.60	6.95	35.90	4.65
4882.00	47.13	AV	54	6.87	42.48	33.60	6.95	35.90	4.65
5990.75	43.07	PK	74	30.93	34.98	35.09	7.58	34.59	8.09
5990.75	--	AV	54	--	--	--	--	--	--
7323.00	45.52	PK	74	28.48	33.82	37.46	9.23	35.00	11.70
7323.00	--	AV	54	--	--	--	--	--	--

Frequency(MHz):			2441		Polarity:			VERTICAL	
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
4882.00	57.34	PK	74	16.66	52.69	33.60	6.95	35.90	4.65
4882.00	48.62	AV	54	5.38	43.97	33.60	6.95	35.90	4.65
7044.80	44.91	PK	74	29.09	34.52	36.34	9.12	35.07	10.39
7044.80	--	AV	54	--	--	--	--	--	--
7323.00	48.15	PK	74	25.85	36.45	37.46	9.23	35.00	11.70
7323.00	--	AV	54	--	--	--	--	--	--

Frequency(MHz):			2480		Polarity:			HORIZONTAL	
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
4960.00	56.70	PK	74	17.30	51.78	33.84	7.00	35.92	4.92
4960.00	46.85	AV	54	7.15	41.93	33.84	7.00	35.92	4.92
5815.90	43.62	PK	74	30.38	35.85	34.80	7.49	34.52	7.77
5815.90	--	AV	54	--	--	--	--	--	--
7440.00	45.19	PK	74	28.81	33.24	37.64	9.28	34.97	11.95
7440.00	--	AV	54	--	--	--	--	--	--

Frequency(MHz):			2480		Polarity:			VERTICAL	
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
4960.00	57.49	PK	74	16.51	52.57	33.84	7.00	35.92	4.92
4960.00	48.80	AV	54	5.20	43.88	33.84	7.00	35.92	4.92
5792.10	44.01	PK	74	29.99	36.25	34.80	7.48	34.52	7.76
5792.10	--	AV	54	--	--	--	--	--	--
7440.00	47.35	PK	74	26.65	35.40	37.64	9.28	34.97	11.95
7440.00	--	AV	54	--	--	--	--	--	--

REMARKS:

1. Emission level (dBuV/m) =Raw Value (dBuV)+Correction Factor (dB/m)
2. Correction Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor
3. Margin value = Limit value- Emission level.
4. -- Mean the PK detector measured value is below average limit.
5. The other emission levels were very low against the limit.
6. RBW1MHz VBW3MHz Peak detector is for PK value; RBW 1MHz VBW10Hz Peak detector is for AV value.

Results of Band Edges Test (Radiated)

Note: GFSK, Pi/4 DQPSK and 8DPSK all have been tested, only worse case GFSK is reported.

Frequency(MHz):			2402		Polarity:			HORIZONTAL	
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2402.00	97.52	PK	--	--	64.12	28.78	4.61	0.00	33.40
2402.00	88.37	AV	--	--	54.97	28.78	4.61	0.00	33.40
2350.05	46.51	PK	74	27.49	13.48	28.47	4.56	0.00	33.03
2350.05	--	AV	54	--	--	--	--	--	--
2390.00	44.86	PK	74	29.14	11.54	28.72	4.60	0.00	33.32
2390.00	--	AV	54	--	--	--	--	--	--
2400.00	48.09	PK	74	25.91	14.70	28.78	4.61	0.00	33.39
2400.00	--	AV	54	--	--	--	--	--	--

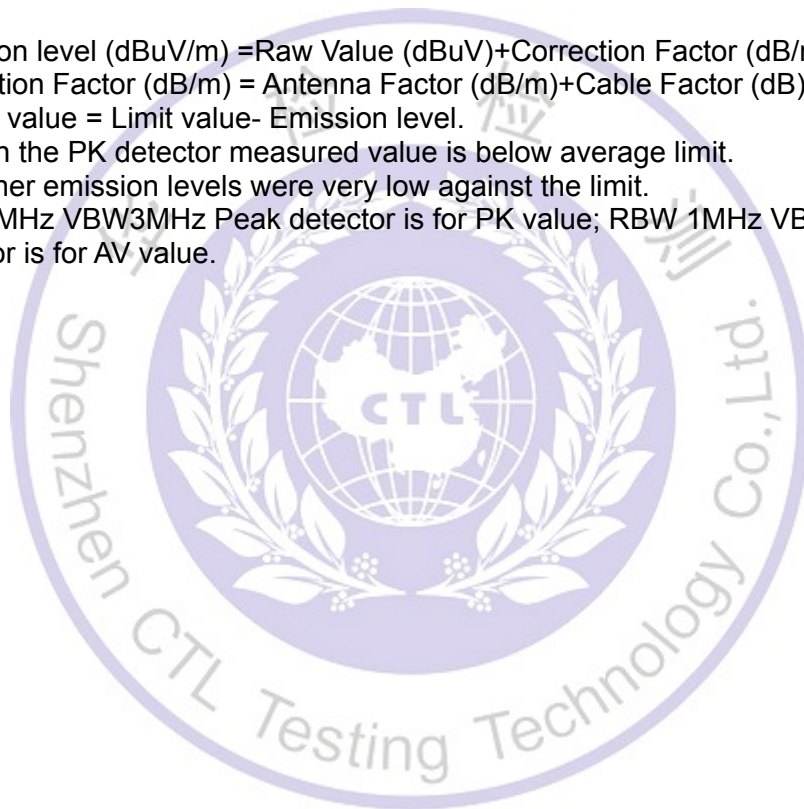
Frequency(MHz):			2402		Polarity:			VERTICAL	
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2402.00	99.90	PK	--	--	66.50	28.78	4.61	0.00	33.40
2402.00	90.94	AV	--	--	57.54	28.78	4.61	0.00	33.40
2350.05	47.22	PK	74	26.78	14.19	28.47	4.56	0.00	33.03
2350.05	--	AV	54	--	--	--	--	--	--
2390.00	45.00	PK	74	29.00	11.68	28.72	4.60	0.00	33.32
2390.00	--	AV	54	--	--	--	--	--	--
2400.00	50.06	PK	74	23.94	16.67	28.78	4.61	0.00	33.39
2400.00	--	AV	54	--	--	--	--	--	--

Frequency(MHz):			2480		Polarity:			HORIZONTAL	
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2480.00	99.27	PK	--	--	65.65	28.92	4.70	0.00	33.62
2480.00	90.52	AV	--	--	56.90	28.92	4.70	0.00	33.62
2483.50	48.31	PK	74	25.69	14.68	28.93	4.70	0.00	33.63
2483.50	--	AV	54	--	--	--	--	--	--
2485.45	45.38	PK	74	28.62	11.74	28.93	4.70	0.00	33.64
2485.45	--	AV	54	--	--	--	--	--	--
2500.00	41.20	PK	74	32.80	7.52	28.96	4.72	0.00	33.68
2500.00	--	AV	54	--	--	--	--	--	--

Frequency(MHz):			2480		Polarity:			VERTICAL	
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2480.00	101.42	PK	--	--	67.80	28.92	4.70	0.00	33.62
2480.00	92.60	AV	--	--	58.98	28.92	4.70	0.00	33.62
2483.50	49.54	PK	74	24.46	15.91	28.93	4.70	0.00	33.63
2483.50	--	AV	54	--	--	--	--	--	--
2485.45	44.81	PK	74	29.19	11.17	28.93	4.70	0.00	33.64
2485.45	--	AV	54	--	--	--	--	--	--
2500.00	42.08	PK	74	31.92	8.40	28.96	4.72	0.00	33.68
2500.00	--	AV	54	--	--	--	--	--	--

REMARKS:

1. Emission level (dBuV/m) =Raw Value (dBuV)+Correction Factor (dB/m)
2. Correction Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor
3. Margin value = Limit value- Emission level.
4. -- Mean the PK detector measured value is below average limit.
5. The other emission levels were very low against the limit.
6. RBW1MHz VBW3MHz Peak detector is for PK value; RBW 1MHz VBW10Hz Peak detector is for AV value.



3.3. Maximum Peak Output Power

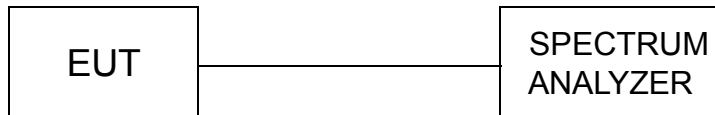
Limit

The Maximum Peak Output Power Measurement is 125mW(20.97).

Test Procedure

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

Test Configuration



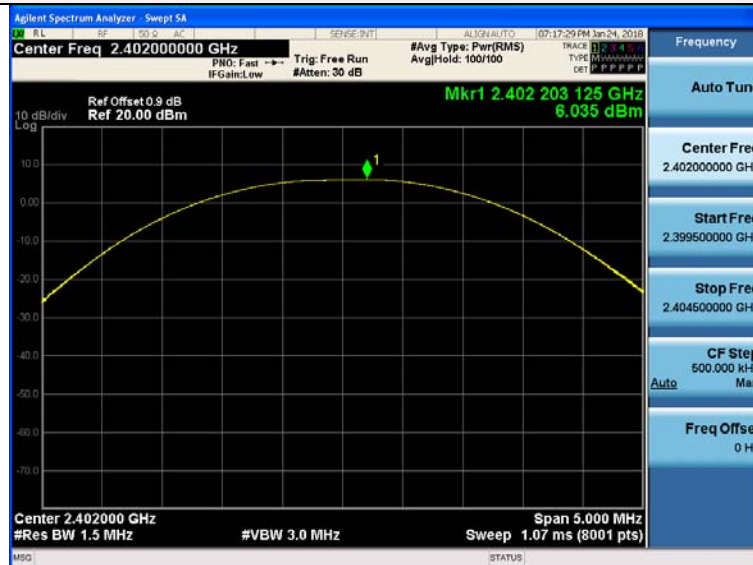
Test Results

Type	Channel	Output power (dBm)	Limit (dBm)	Result
GFSK	00	6.035	20.97	Pass
	39	8.352		
	78	8.550		
π/4DQPSK	00	3.803	20.97	Pass
	39	6.695		
	78	6.869		
8DPSK	00	4.185	20.97	Pass
	39	7.001		
	78	7.190		

Note: 1.The test results including the cable lose.

Test plot as follows:

GFSK Modulation



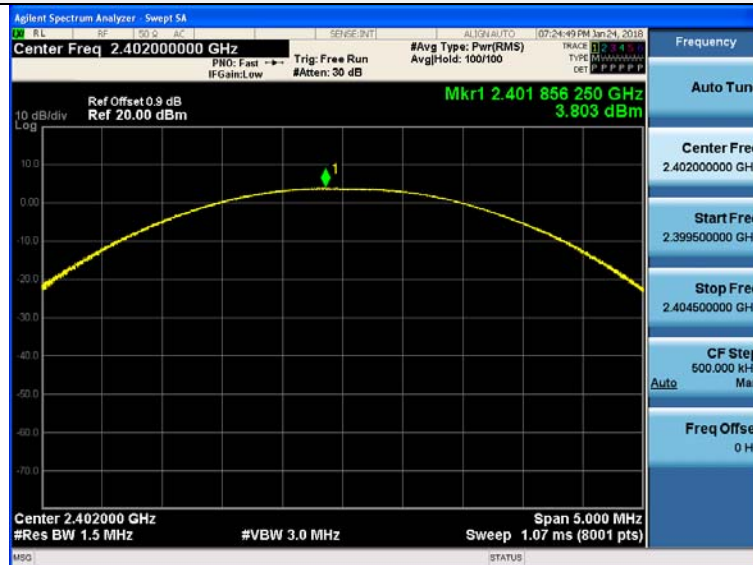
CH00



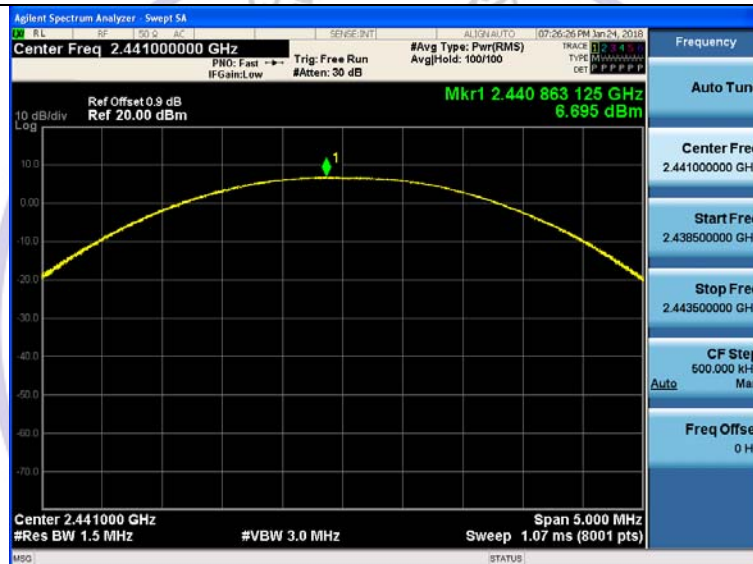
CH39



CH78

$\pi/4$ DQPSK Modulation

CH00

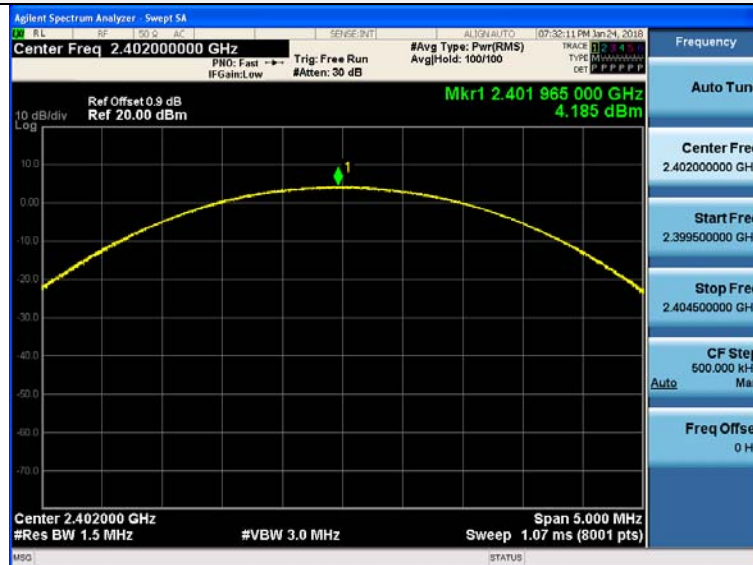


CH39

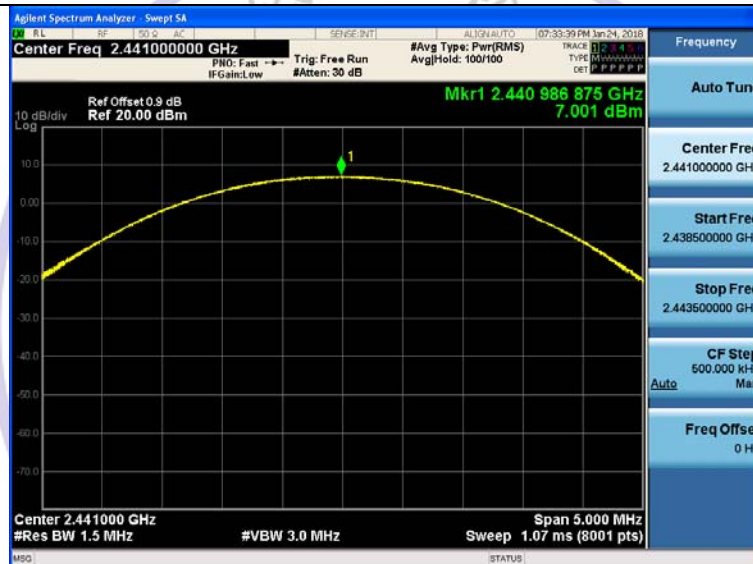


CH78

8DPSK Modulation



CH00



CH39



CH78

3.4. 20dB Bandwidth

Limit

For frequency hopping systems operating in the 2400MHz-2483.5MHz no limit for 20dB bandwidth.

Test Procedure

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 30 KHz RBW and 100 KHz VBW.

The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

Test Configuration



Test Results

Modulation	Channel	20dB bandwidth (MHz)	99% OBW (MHz)	Result
GFSK	CH00	0.9420	0.87117	Pass
	CH39	0.9381	0.85498	
	CH78	0.9426	0.85620	
$\pi/4$ DQPSK	CH00	1.228	1.1691	
	CH39	1.226	1.1686	
	CH78	1.225	1.1695	
8DPSK	CH00	1.258	1.1719	
	CH39	1.256	1.1599	
	CH78	1.260	1.1704	

Test plot as follows:

Agilent Spectrum Analyzer - Occupied BW

Center Freq 2.402000000 GHz

Ref Offset 0.9 dB
Ref 20.00 dBm

Log

10 dB/Div

0.00
-10.00
-20.00
-30.00
-40.00
-50.00
-60.00
-70.00

Center 2.402 GHz
#Res BW 30 kHz

#VBW 100 kHz

Span 3 MHz
Sweep 3.2 ms

Occupied Bandwidth

871.17 kHz

Total Power

13.2 dBm

Transmit Freq Error

20.444 kHz

OBW Power

99.00 %

x dB Bandwidth

942.0 kHz

x dB

-20.00 dB

Agilent Spectrum Analyzer - Occupied BW

Center Freq 2.441000000 GHz

Ref Offset 0.9 dB
Ref 20.00 dBm

10 dB/div

Center 2.441 GHz
#Res BW 30 kHz

#VBW 100 kHz

Span 3 MHz
Sweep 3.2 ms

Occupied Bandwidth 854.98 kHz

Total Power 15.7 dBm

Transmit Freq Error 6.330 kHz

OBW Power 99.00 %

x dB Bandwidth 938.1 kHz

x dB -20.00 dB

The screenshot displays the Agilent Spectrum Analyzer interface. At the top, the title bar reads "Agilent Spectrum Analyzer - Occupied BW". The main display area shows a frequency spectrum plot with a yellow trace. The plot has a vertical scale of 10 dB/div and a horizontal scale of 30 kHz. The signal is centered at 2.48 GHz. The peak power is 16.0 dBm, and the occupied bandwidth is 856.20 kHz. The resolution bandwidth (RBW) is 30 kHz, and the video bandwidth (VBW) is 100 kHz. The span is 3 MHz, and the sweep time is 3.2 ms. The center frequency is 2.480000000 GHz, and the radio standard is None. The reference level is 20.00 dBm, and the reference offset is 0.9 dB. The IF gain is Low, and the attenuation is 30 dB. The radio device is BST.

Parameter	Value
Center Freq	2.480000000 GHz
Radio Std	None
Ref Offset	0.9 dB
Ref	20.00 dBm
IF Gain	Low
Atten	30 dB
Radio Device	BST
Center Freq	2.48 GHz
#Res BW	30 kHz
#VBW	100 kHz
Span	3 MHz
Sweep	3.2 ms
Occupied Bandwidth	856.20 kHz
Total Power	16.0 dBm
Transmit Freq Error	6.469 kHz
OBW Power	99.00 %
x dB Bandwidth	942.6 kHz
x dB	-20.00 dB

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Agilent Spectrum Analyzer - Occupied BW

Center Freq 2.402000000 GHz

Ref Offset 0.9 dB
Ref 20.00 dBm

Log

10 dB/div

Center 2.402 GHz
#Res BW 30 kHz

#VBW 100 kHz

Span 3 MHz
Sweep 3.2 ms

Occupied Bandwidth 1.1691 MHz

Total Power 9.59 dBm

Transmit Freq Error 4.006 kHz

OBW Power 99.00 %

x dB Bandwidth 1.228 MHz

x dB -20.00 dB

Agilent Spectrum Analyzer - Occupied BW

Center Freq 2.441000000 GHz

Ref Offset 0.9 dB
Ref 20.00 dBm

Span 3 MHz
Sweep 3.2 ms

Occupied Bandwidth: 1.1686 MHz

Total Power: 12.6 dBm

Transmit Freq Error: 3.376 kHz

OBW Power: 99.00 %

x dB Bandwidth: 1.226 MHz

x dB: -20.00 dB

Agilent Spectrum Analyzer - Occupied BW

RL RF 150 GHz AC SENSE INT ALIGN AUTO 07:29:45 PM Jan 24, 2018

Center Freq 2.480000000 GHz Center Freq: 2.480000000 GHz Radio Std: None

#IF Gain: Low #Atten: 30 dB Avg/Hold: 10/10 Radio Device: BTS

Ref Offset 0.9 dB
Ref 20.00 dBm

Center 2.48 GHz Span 3 MHz
#Res BW 30 kHz #VBW 100 kHz Sweep 3.2 ms

Occupied Bandwidth		Total Power	
1.1695 MHz		12.7 dBm	

Transmit Freq Error		OBW Power	
3.568 kHz		99.00 %	

x dB Bandwidth		x dB	
1.225 MHz		-20.00 dB	

CF Stop 300.000 kHz
Ma
Freq Offset 0 Hz

MSO STATUS

CH78