

FCC RADIO TEST REPORT

FCC ID: ADNJSC-FA002

Product : Bluetooth controller

Trade Name : N/A

Model Name : JSC-FA002

Serial Model : JSC-FA004,JSC-FA006,
JSC-FA008,JSC-FA010,JSC-FA012,JSC-FA014

Report No.: PTS1301093005R

Prepared for

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TEST RESULT CERTIFICATION

Applicant's name : Shenzhen J&S Technology & Development Co., Ltd.
Address : Unit 806, Tower A, Skyworth bldg., Gaoxin South 1st Ave., Hi-Tech Industrial Park, Nanshan District, Shenzhen, China
Manufacture's Name : Shenzhen J&S Technology & Development Co., Ltd.
Address : Unit 806, Tower A, Skyworth bldg., Gaoxin South 1st Ave., Hi-Tech Industrial Park, Nanshan District, Shenzhen, China

Product description

Product name : Bluetooth controller
Model and/or type reference : JSC-FA002
Serial Model : JSC-FA004, JSC-FA006,
JSC-FA008, JSC-FA010, JSC-FA012, JSC-FA014

Standards : FCC Part15.247:2012

Test procedure ANSI C63.4-2003, DA00-705

This device described above has been tested by PTS, 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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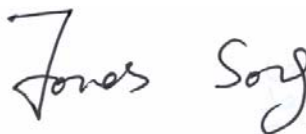
Date of Test

Date (s) of performance of tests 9 Jun. 2013 ~14 Jun. 2013

Date of Issue 14 Jun. 2013

Test Result **Pass**

Prepared by :



Assistant

Reviewer :



Supervisor

Approved & Authorized Signer :



Jacky Ou / Manager

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1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part15 (15.247) , Subpart C			
Standard Section	Test Item	Judgment	Remark
15.207	Conducted Emission	PASS	
15.247(a)(1)	Hopping Channel Separation	PASS	
15.247(b)(1)	Peak Output Power	PASS	
15.247(c)	Radiated Spurious Emission	PASS	
15.247(a)(iii)	Number of Hopping Frequency	PASS	
15.247(a)(iii)	Dwell Time	PASS	
15.247(a)(1)	Bandwidth	PASS	
15.205	Band Edge Emission	PASS	
15.203	Antenna Requirement	PASS	

NOTE:

(1) "N/A" denotes test is not applicable in this Test Report

1.1 TEST FACILITY

NTEK Testing Technology Co., Ltd.

Add. : 1/F, Building E, Fenda Science Park, Sanwei Community, Xixiang Street, Bao'an District, Shenzhen P.R. China.

FCC Registration Number: 238937; IC Registration Number: 9270A-1

CNAS Registration Number: L5516

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately **95 %**.

No.	Item	Uncertainty
1	Conducted Emission Test	$\pm 1.38\text{dB}$
2	RF power,conducted	$\pm 0.16\text{dB}$
3	Spurious emissions,conducted	$\pm 0.21\text{dB}$
4	All emissions,radiated(<1G)	$\pm 4.68\text{dB}$
5	All emissions,radiated(>1G)	$\pm 4.89\text{dB}$
6	Temperature	$\pm 0.5^{\circ}\text{C}$
7	Humidity	$\pm 2\%$

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	Bluetooth controller	
Model Name	JSC-FA002	
Serial Model	JSC-FA004,JSC-FA006, JSC-FA008,JSC-FA010,JSC-FA012,JSC-FA014	
Model Difference	All models are identical except model names.	
Product Description	The EUT is a Bluetooth controller	
	Operation Frequency:	2402~2480 MHz
	Modulation Type:	BT(1Mbps): GFSK
	Bit Rate of Transmitter	1Mbps
	Number Of Channel	79 CH
	Antenna Designation:	Please see Note 3.
	Output Power(Conducted):	BT(1Mbps): 0.435dBm
Channel List	Please refer to the Note 2.	
Adapter	N/A	
Battery	Rated Voltage: 3.7V	
	Charge Limit: 4.2V	
	Capacity :800mAh	
Connecting I/O Port(s)	Please refer to the User's Manual	

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

2.

Channel List					
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
00	2402	27	2429	54	2456
01	2403	28	2430	55	2457
02	2404	29	2431	56	2458
03	2405	30	2432	57	2459
04	2406	31	2433	58	2460
05	2407	32	2434	59	2461
06	2408	33	2435	60	2462
07	2409	34	2436	61	2463
08	2410	35	2437	62	2464
09	2411	36	2438	63	2465
10	2412	37	2439	64	2466
11	2413	38	2440	65	2467
12	2414	39	2441	66	2468
13	2415	40	2442	67	2469
14	2416	41	2443	68	2470
15	2417	42	2444	69	2471
16	2418	43	2445	70	2472
17	2419	44	2446	71	2473
18	2420	45	2447	72	2474
19	2421	46	2448	73	2475
20	2422	47	2449	74	2476
21	2423	48	2450	75	2477
22	2424	49	2451	76	2478
23	2425	50	2452	77	2479
24	2426	51	2453	78	2480
25	2427	52	2454		
26	2428	53	2455		

3.

Table for Filed Antenna

Ant .	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	NOTE
1	N/A	N/A	FPCB Antenna	NA	0	BT Antenna

2.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	CH00
Mode 2	CH39
Mode 3	CH78
Mode 4	Link mode

For Conducted Emission	
Final Test Mode	Description
Mode 4	Link mode

For Radiated Emission	
Final Test Mode	Description
Mode 1	CH00
Mode 2	CH39
Mode 3	CH78

Note:

- (1) The measurements are performed at the highest, middle, lowest available channels.
- (2) The EUT use new battery.
- (3)The data rate was set in 1Mbps for radiated emission due to the highest RF output power.

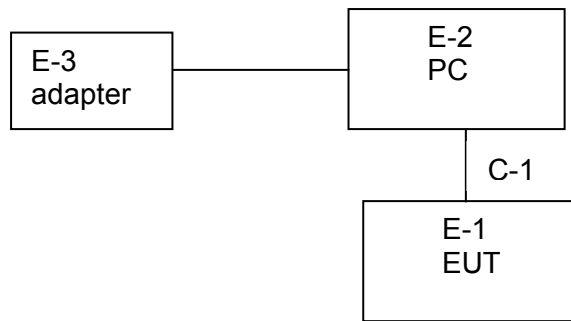
2.3 TABLE OF PARAMETERS OF TEXT SOFTWARE SETTING

During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product power parameters of FHSS

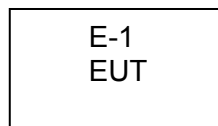
Test software Version	Test program: N/A		
Frequency	2402 MHz	2441 MHz	2480 MHz
Parameters(1Mbps)	DEF	DEF	DEF

2.4 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Conducted Emission Test



Radiated Spurious Emission Test



2.5 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Note
E-1	Bluetooth controller	N/A	JSC-FA002	N/A	EUT
E-2	PC	Dell	BZ00513	N/A	
E-3	ADAPTER	Dell	JK02050300-181	N/A	

Item	Shielded Type	Ferrite Core	Length	Note
C1	No	No	100cm	
C2	No	No	120cm	

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.
- (3) “YES” is means “shielded” “with core”; “NO” is means “unshielded” “without core”.

2.6 EQUIPMENTS LIST FOR ALL TEST ITEMS

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Spectrum Analyzer	Agilent	E4407B	160400005	2012.07.06	2013.07.05	1 year
2	Test Receiver	R&S	ESPI	101318	2012.07.06	2013.07.05	1 year
3	Bilog Antenna	TESEQ	CBL6111D	31216	2013.06.07	2014.06.06	1 year
4	50Ω Coaxial Switch	Anritsu	MP59B	6200264416	2012.07.06	2013.07.05	1 year
5	Spectrum Analyzer	ADVANTES T	R3132	150900201	2013.06.07	2014.06.06	1 year
6	Horn Antenna	EM	EM-AH-20180	2011071402	2013.06.07	2014.06.06	1 year
7	Horn Ant	Schwarzbeck	BBHA 9170	9170-181	2013.06.07	2014.06.06	1 year
8	Amplifier	EM	EM-30180	060538	2012.07.06	2013.07.05	1 year
9	Loop Antenna	ARA	PLA-2030/B	1029	2013.06.07	2014.06.06	1 year
10	Power Meter	R&S	NRVS	100696	2012.07.06	2013.07.05	1 year
11	Signal Generator	R&S	SMT 06	832080/007	2012.07.06	2013.07.05	1 year
12	Temperature & Humidity Chamber	GIANT FORCE	GTH-056P	GF-94454-1	2012.07.06	2013.07.05	1 year
13	Power Sensor	R&S	URV5-Z4	0395.1619.05	2013.06.07	2014.06.06	1 year

3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 POWER LINE CONDUCTED EMISSION Limits (Frequency Range 150KHz-30MHz)

FREQUENCY (MHz)	(dBuV)		Standard
	Quasi-peak	Average	
0.15 -0.5	66 - 56 *	56 - 46 *	CISPR
0.50 -5.0	56.00	46.00	CISPR
5.0 -30.0	60.00	50.00	CISPR

0.15 -0.5	66 - 56 *	56 - 46 *	FCC
0.50 -5.0	56.00	46.00	FCC
5.0 -30.0	60.00	50.00	FCC

Note:

- (1) The tighter limit applies at the band edges.
- (2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

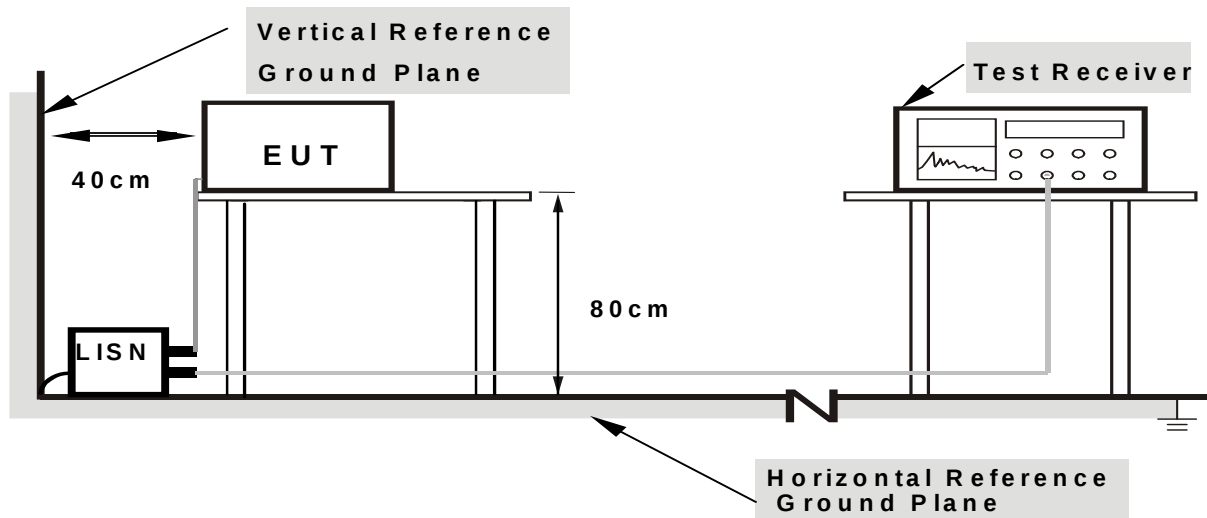
3.1.2 TEST PROCEDURE

- The EUT was placed 0.4 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- LISN at least 80 cm from nearest part of EUT chassis.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.1.3 DEVIATION FROM TEST STANDARD

No deviation

3.1.4 TEST SETUP



Note: 1.Support units were connected to second LISN.

2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

3.1.5 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

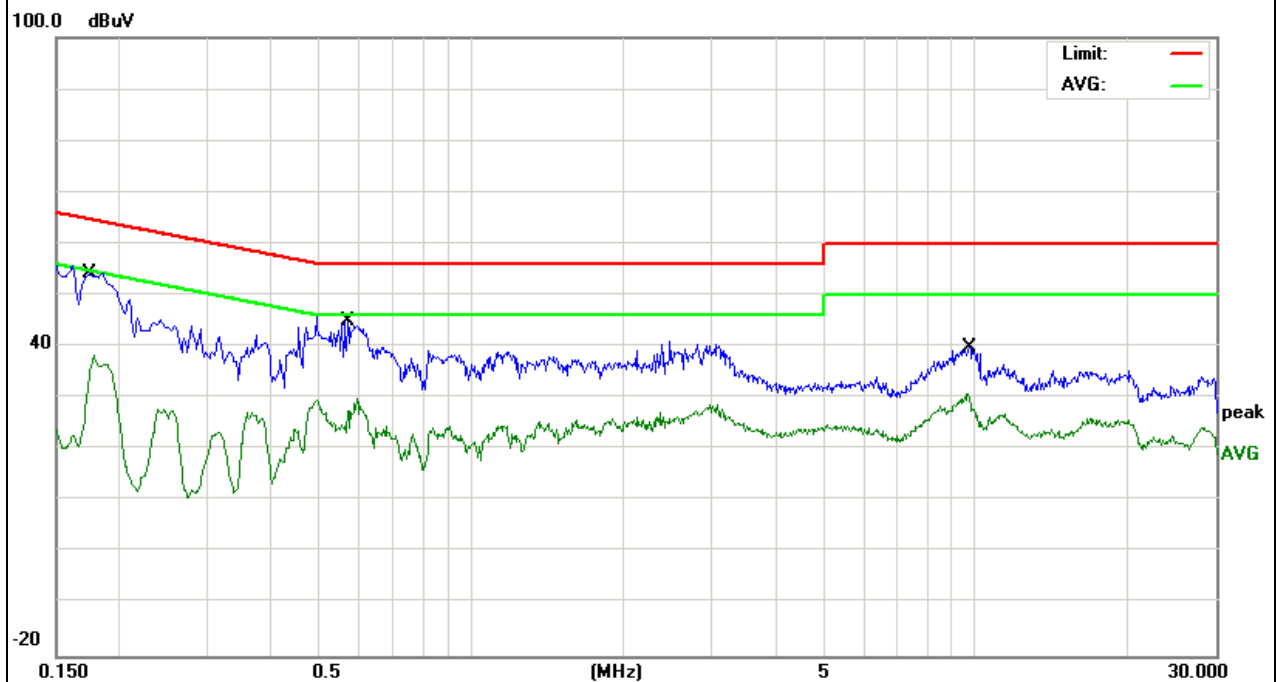
3.1.6 TEST RESULTS

EUT :	Bluetooth controller	Model Name :	JSC-FA002
Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1010hPa	Phase :	L
Test Voltage :	USB 5V from PC	Test Mode :	4

Freq. (MHz)	Reading (dBuV)	Factor (dBuV)	Measurement (dBuV)	Limit (dBuV)	Over (dB)	Detector
0.1740	44.31	9.80	54.11	64.76	-10.65	QP
0.1740	28.57	9.80	38.37	54.76	-16.39	AVG
0.5700	34.83	10.20	45.03	56.00	-10.97	QP
0.5700	17.48	10.20	27.68	46.00	-18.32	AVG
9.6699	29.41	10.33	39.74	60.00	-20.26	QP
9.6699	20.55	10.33	30.88	50.00	-19.12	AVG

Remark:

Factor = Insertion Loss + Cable Loss.

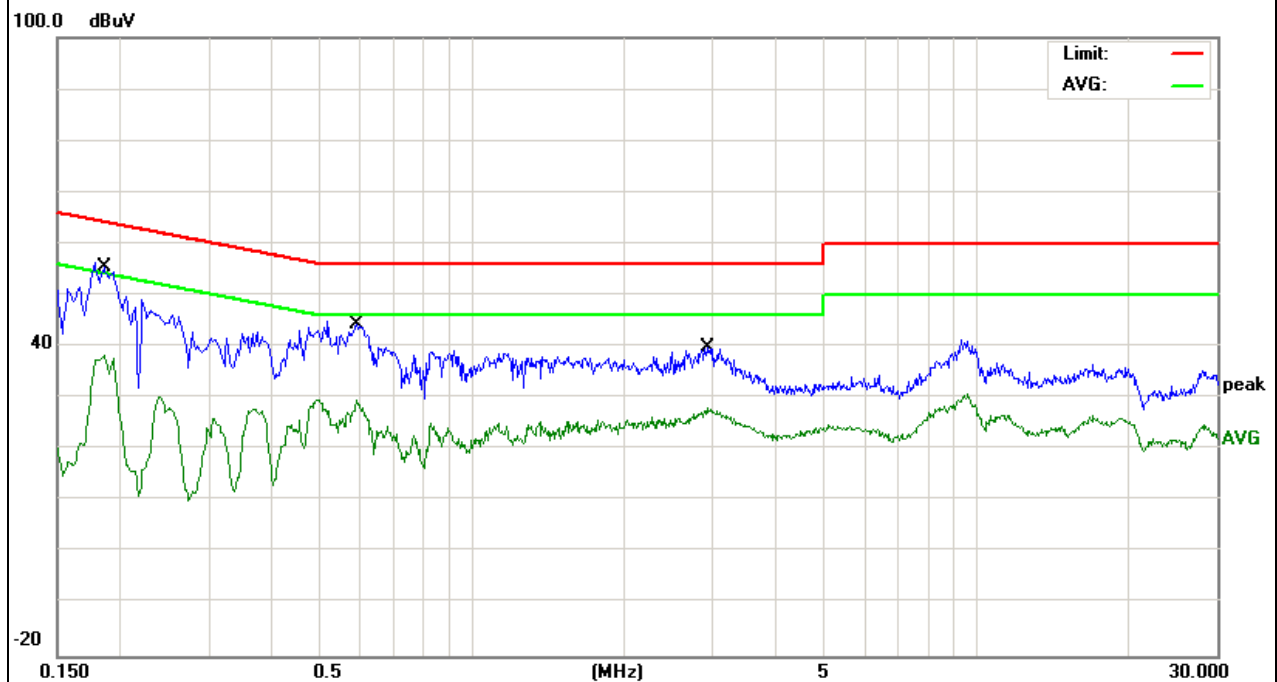


EUT :	Bluetooth controller	Model Name :	JSC-FA002
Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1010hPa	Phase :	N
Test Voltage :	USB 5V from PC	Test Mode :	4

Freq. (MHz)	Reading (dBuV)	Factor (dBuV)	Measurement (dBuV)	Limit (dBuV)	Over (dB)	Detector
0.1860	45.32	10.10	55.42	64.21	-8.79	QP
0.1860	28.35	10.10	38.45	54.21	-15.76	AVG
0.5899	34.19	10.22	44.41	56.00	-11.59	QP
0.5899	19.53	10.22	29.75	46.00	-16.25	AVG
2.9300	29.55	10.28	39.83	56.00	-16.17	QP
2.9300	17.79	10.28	28.07	46.00	-17.93	AVG

Remark:

Factor = Insertion Loss + Cable Loss.



3.2 RADIATED EMISSION MEASUREMENT

3.2.1 RADIATED EMISSION LIMITS (Frequency Range 9kHz-1000MHz)

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

FREQUENCY (MHz)	(dBuV/m) (at 3M)	
	PEAK	AVERAGE
Above 1000	74	54

Notes:

- (1) The limit for radiated test was performed according to FCC PART 15C.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

FREQUENCY RANGE OF RADIATED MEASUREMENT (For intentional radiators)

- (1) If the intentional radiator operates below 10 GHz: to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.
- (2) If the intentional radiator operates at or above 10 GHz and below 30 GHz: to the fifth harmonic of the highest fundamental frequency or to 100 GHz, whichever is lower.
- (3) If the intentional radiator operates at or above 30 GHz: to the fifth harmonic of the highest fundamental frequency or to 200 GHz, whichever is lower, unless specified otherwise elsewhere in the rules.

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RB / VB (emission in restricted band)	1 MHz / 1 MHz for Peak, 1 MHz / 10Hz for Average

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

3.2.2 TEST PROCEDURE

- The measuring distance of at 3 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
- The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

Note:

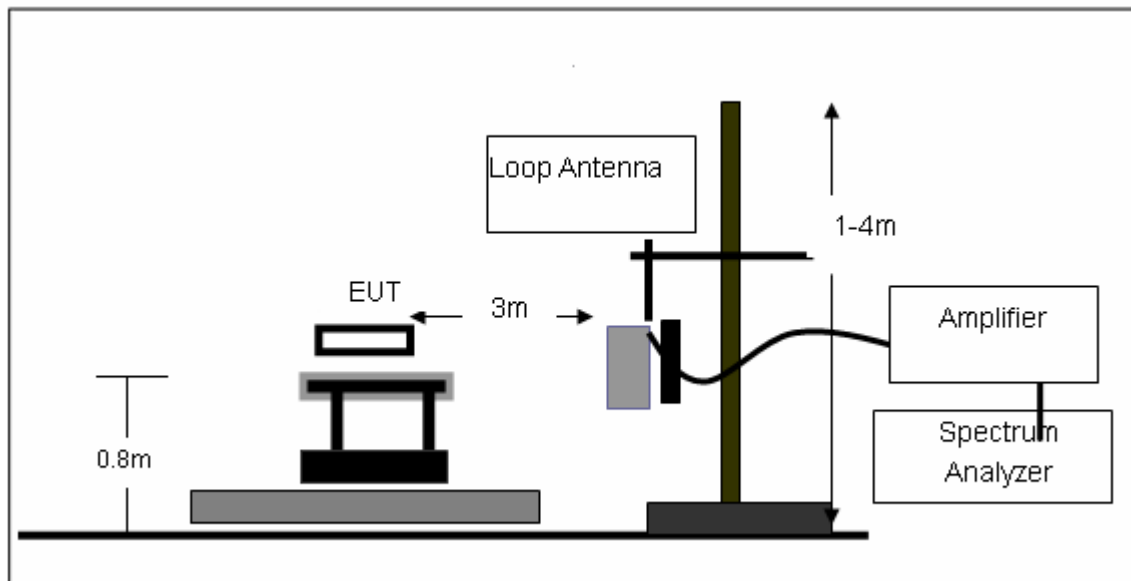
Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported

3.2.3 DEVIATION FROM TEST STANDARD

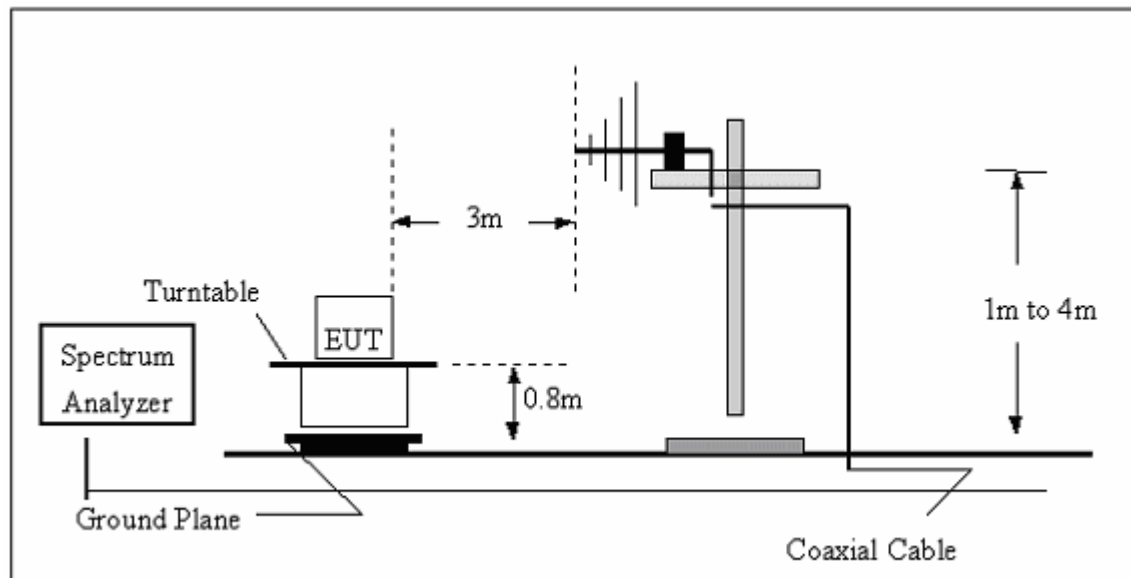
No deviation

3.2.4 TEST SETUP

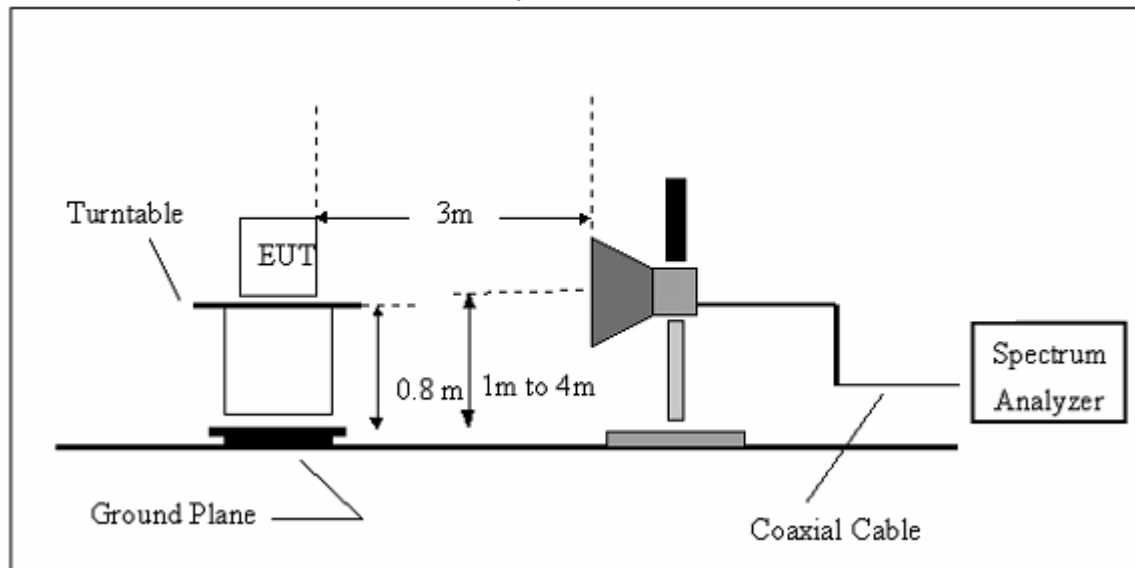
(A) Radiated Emission Test-Up Frequency Below 30MHz



(B) Radiated Emission Test-Up Frequency 30MHz~1GHz



(C) Radiated Emission Test-Up Frequency Above 1GHz



3.2.5 EUT OPERATING CONDITIONS

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

3.2.6 TEST RESULTS (BELOW 30 MHZ)

EUT :	Bluetooth controller	Model Name :	JSC-FA002
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Polarization :	---
Test Voltage :	DC 3.7V		
Test Mode :	TX		

Freq.	Reading	Limit	Margin	State
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F
--	--	--	--	PASS
--	--	--	--	PASS

NOTE:

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

Distance extrapolation factor = $20 \log (\text{specific distance/test distance})(\text{dB})$;

Limit line = specific limits(dBuv) + distance extrapolation factor.

3.2.7 TEST RESULTS (BETWEEN 30M – 1000 MHZ)

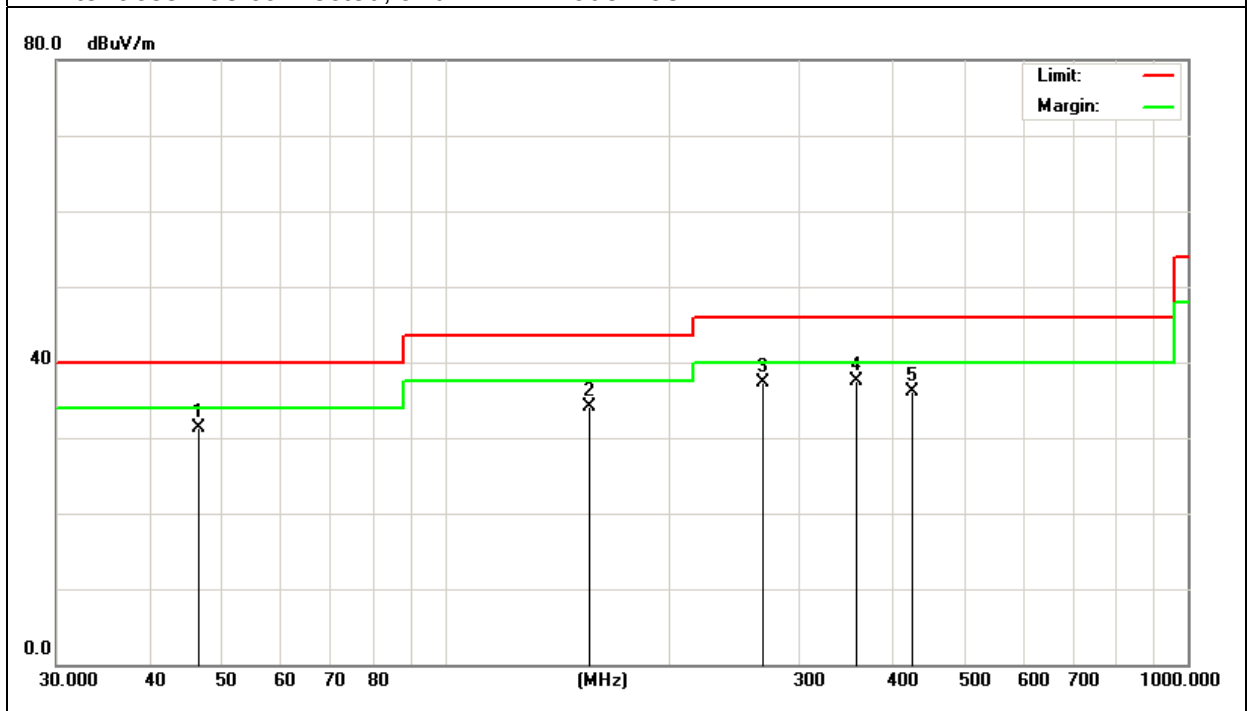
EUT :	Bluetooth controller	Model Name :	JSC-FA002
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Polarization :	Horizontal
Test Voltage :	DC 3.7V		
Test Mode :	TX		

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
46.57	21.44	9.8	31.24	40	-8.76	QP
156.35	22.87	11.14	34.01	43.5	-9.49	QP
267.24	23.57	13.69	37.26	46	-8.74	QP
357.24	21.97	15.5	37.47	46	-8.53	QP
423.57	18.33	17.85	36.18	46	-9.82	QP

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

All interfaces was connected, and BT TX mode was link.



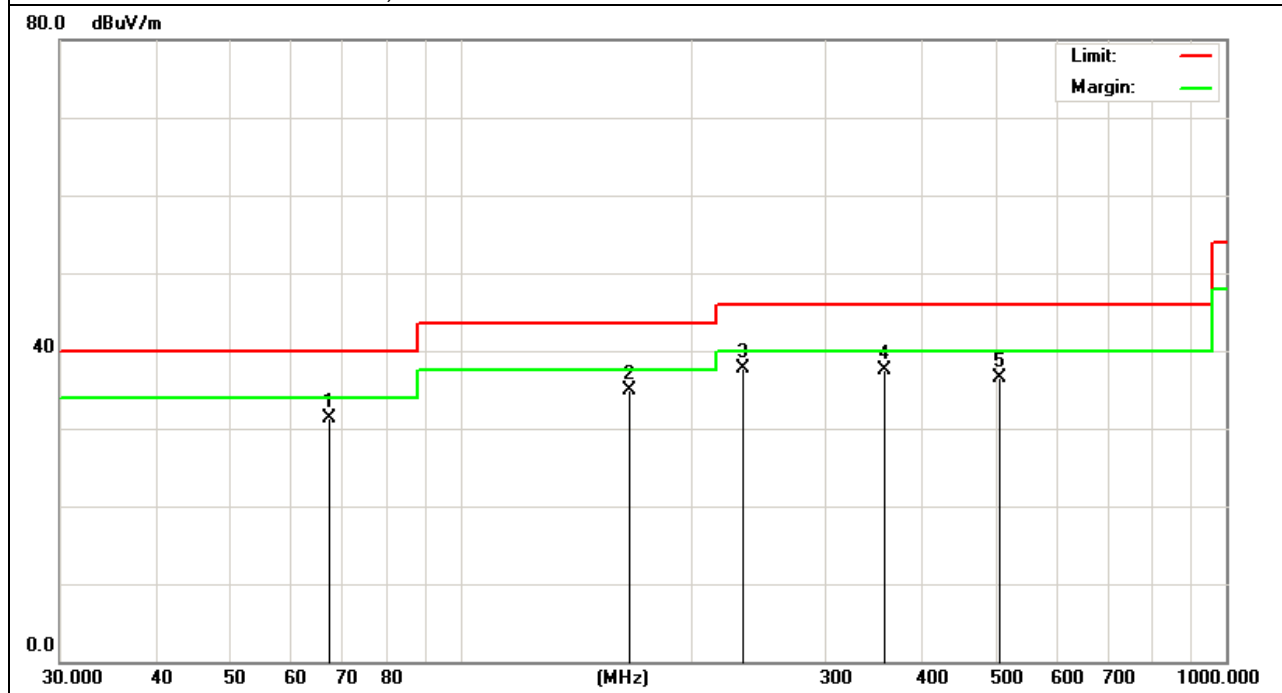
EUT :	Bluetooth controller	Model Name :	JSC-FA002
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Polarization :	Vertical
Test Voltage :	DC 3.7V		
Test Mode :	TX		

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
67.32	25.84	5.55	31.39	40	-8.61	QP
166.52	24.65	10.32	34.97	43.5	-8.53	QP
234.05	27.11	10.67	37.78	46	-8.22	QP
357.241	22.07	15.5	37.57	46	-8.43	QP
505.2	17.16	19.43	36.59	46	-9.41	QP

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

All interfaces was connected, and BT TX mode was link.



3.2.8 TEST RESULTS (ABOVE 1000 MHZ) 1000-26000MHz

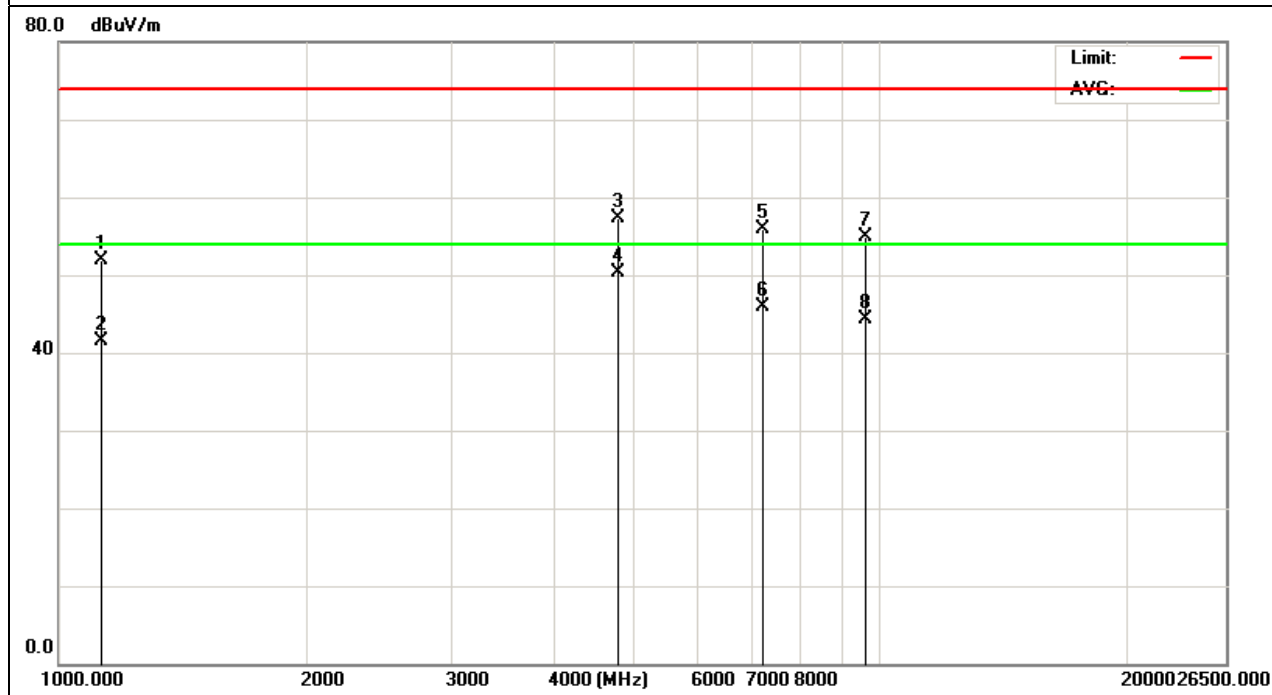
The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

EUT :	Bluetooth controller	Model Name :	JSC-FA002
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC 3.7V
Test Mode :	TX 2402MHz – CH 00(1Mbps)	Polarization :	Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
1125.86	27.33	24.61	51.94	74	-22.06	peak
1125.86	16.95	24.61	41.56	54	-12.44	AVG
4804.9	21.76	35.6	57.36	74	-16.64	peak
4804.9	14.61	35.6	50.21	54	-3.79	AVG
7208.27	19.66	36.26	55.92	74	-18.08	peak
7208.27	9.6	36.26	45.86	54	-8.14	AVG
9608.33	16.87	37.94	54.81	74	-19.19	peak
9608.33	6.38	37.94	44.32	54	-9.68	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

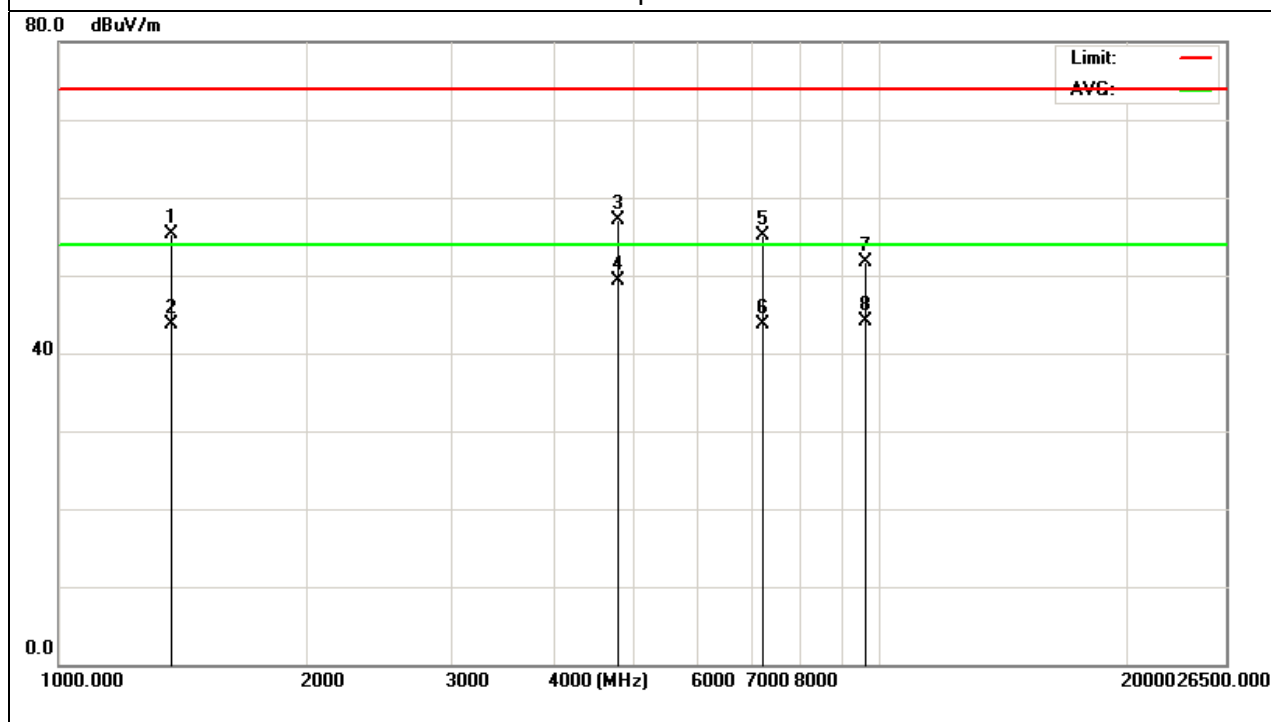


EUT :	Bluetooth controller	Model Name :	JSC-FA002
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC 3.7V
Test Mode :	TX 2402MHz – CH 00(1Mbps)	Polarization :	Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
1365.87	29.87	25.43	55.3	74	-18.7	peak
1365.87	18.35	25.43	43.78	54	-10.22	AVG
4804.22	21.5	35.6	57.1	74	-16.9	peak
4804.22	13.62	35.6	49.22	54	-4.78	AVG
7206.64	18.86	36.26	55.12	74	-18.88	peak
7206.64	7.38	36.26	43.64	54	-10.36	AVG
9608.52	13.75	37.94	51.69	74	-22.31	peak
9608.52	6.07	37.94	44.01	54	-9.99	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

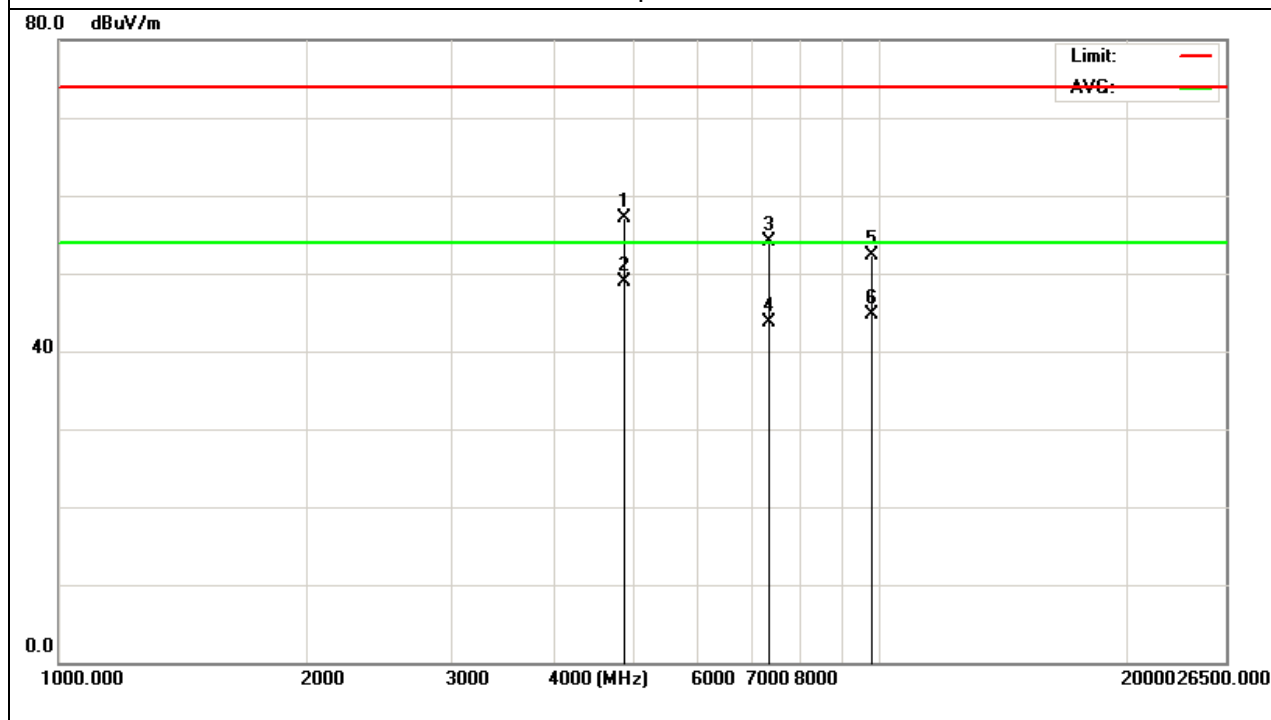


EUT :	Bluetooth controller	Model Name :	JSC-FA002
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC 3.7V
Test Mode :	TX 2441MHz – CH 39(1Mbps)	Polarization :	Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
4882.05	21.57	35.46	57.03	74	-16.97	peak
4882.05	13.52	35.46	48.98	54	-5.02	AVG
7322.41	17.68	36.51	54.19	74	-19.81	peak
7322.41	7.22	36.51	43.73	54	-10.27	AVG
9764.09	15.38	37.01	52.39	74	-21.61	peak
9764.09	7.61	37.01	44.62	54	-9.38	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

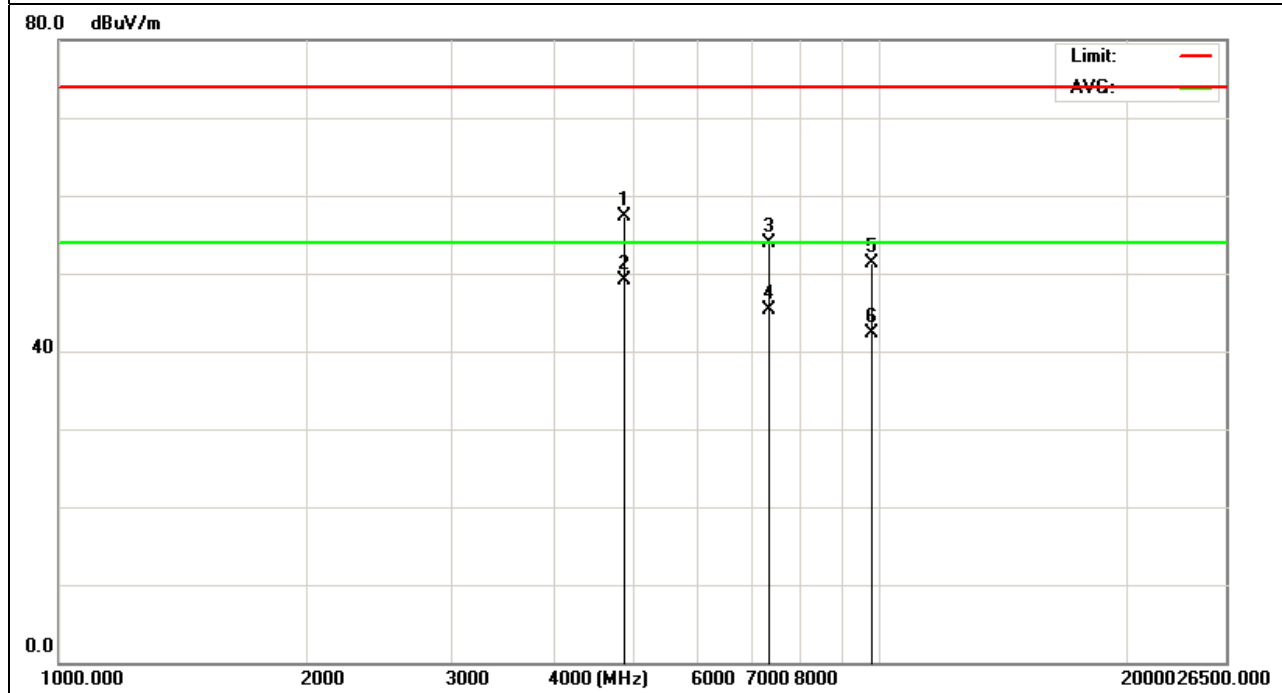


EUT :	Bluetooth controller	Model Name :	JSC-FA002
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC 3.7V
Test Mode :	TX 2441MHz – CH 39(1Mbps)	Polarization :	Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
4882.97	21.87	35.46	57.33	74	-16.67	peak
4882.97	13.69	35.46	49.15	54	-4.85	AVG
7323.6	17.35	36.51	53.86	74	-20.14	peak
7323.6	8.8	36.51	45.31	54	-8.69	AVG
9764.06	14.38	37	51.38	74	-22.62	peak
9764.06	5.29	37	42.29	54	-11.71	AVG

Remark:

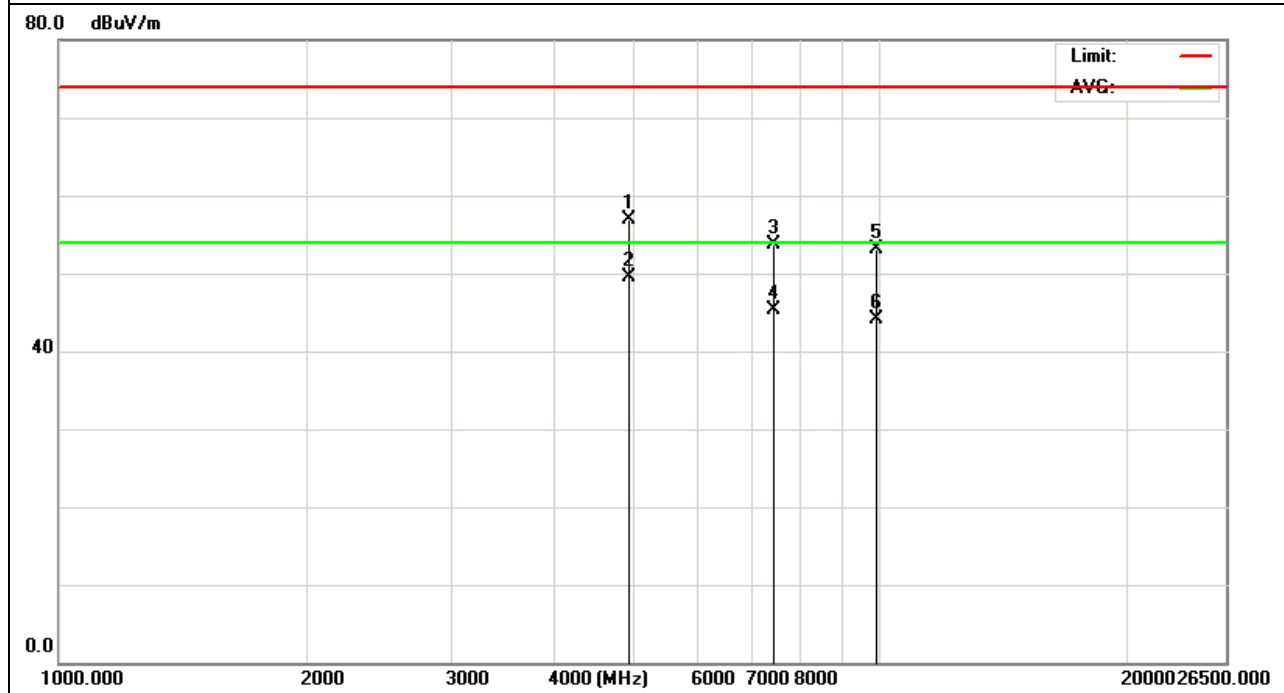
Factor = Antenna Factor + Cable Loss – Pre-amplifier.



EUT :	Bluetooth controller	Model Name :	JSC-FA002
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC 3.7V
Test Mode :	TX 2480MHz – CH 78(1Mbps)	Polarization :	Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
4954.17	21.37	35.49	56.86	74	-17.14	peak
4954.17	13.97	35.49	49.46	54	-4.54	AVG
7431.8	16.97	36.66	53.63	74	-20.37	peak
7431.8	8.67	36.66	45.33	54	-8.67	AVG
9908.2	15.6	37.52	53.12	74	-20.88	peak
9908.2	6.57	37.52	44.09	54	-9.91	AVG

Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.

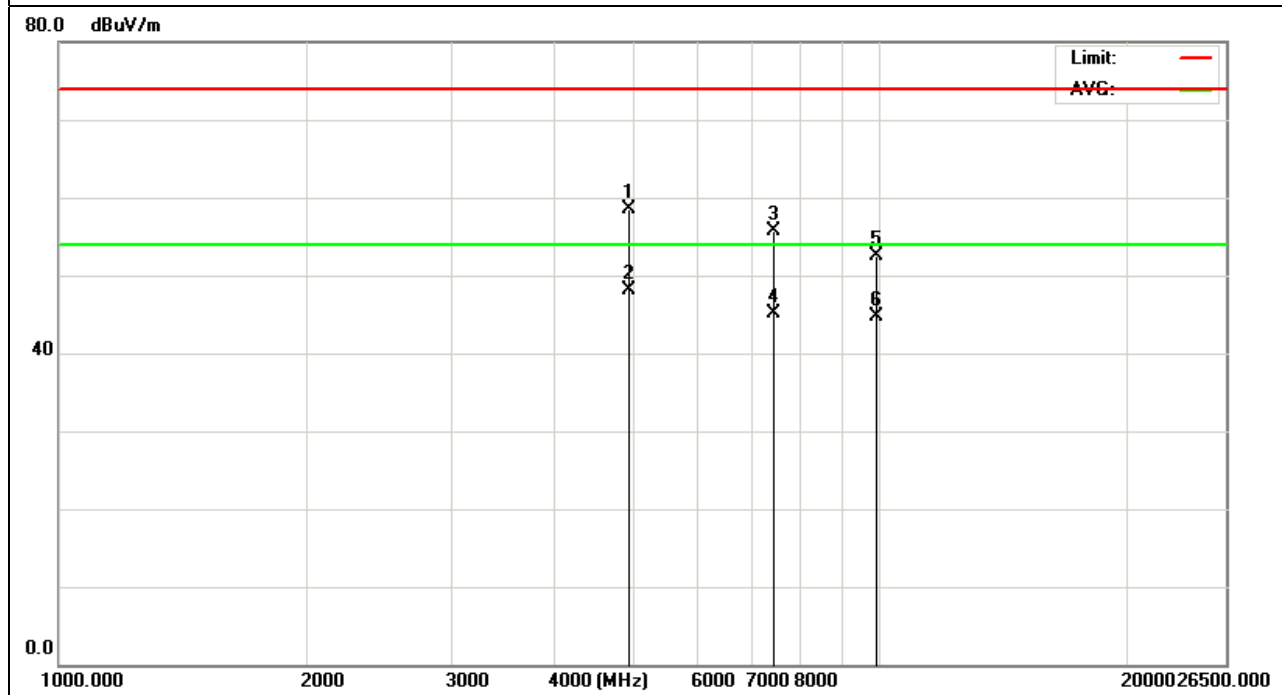


EUT :	Bluetooth controller	Model Name :	JSC-FA002
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC 3.7V
Test Mode :	TX 2480MHz – CH 78(1Mbps)	Polarization :	Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
4956.16	22.96	35.48	58.44	74	-15.56	peak
4956.16	12.64	35.48	48.12	54	-5.88	AVG
7434.3	18.97	36.69	55.66	74	-18.34	peak
7434.3	8.33	36.69	45.02	54	-8.98	AVG
9920.6	14.67	37.74	52.41	74	-21.59	peak
9920.6	6.87	37.74	44.61	54	-9.39	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

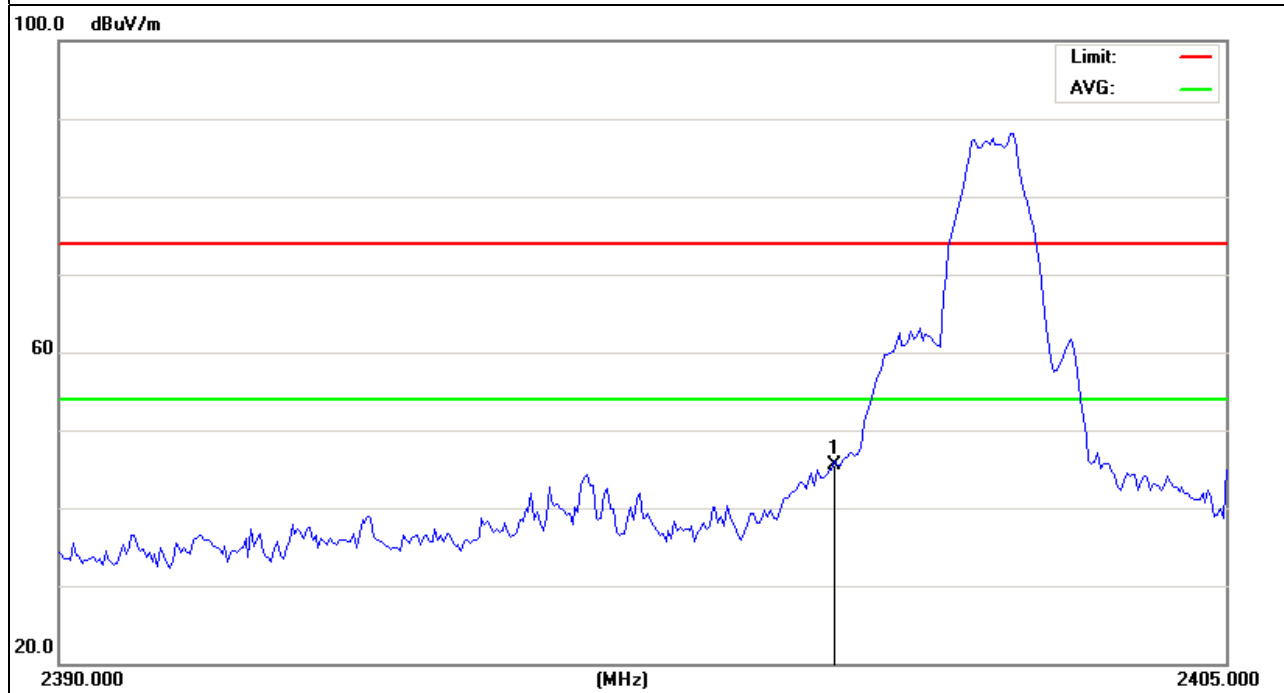


3.2.9 TEST RESULTS (RESTRICTED BANDS REQUIREMENTS)

EUT :	Bluetooth controller	Model Name :	JSC-FA002
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC 3.7V
Test Mode :	TX /2402MHz-1Mbps	Polarization :	Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2400	85.95	-40.5	45.45	74	-28.55	peak

Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.

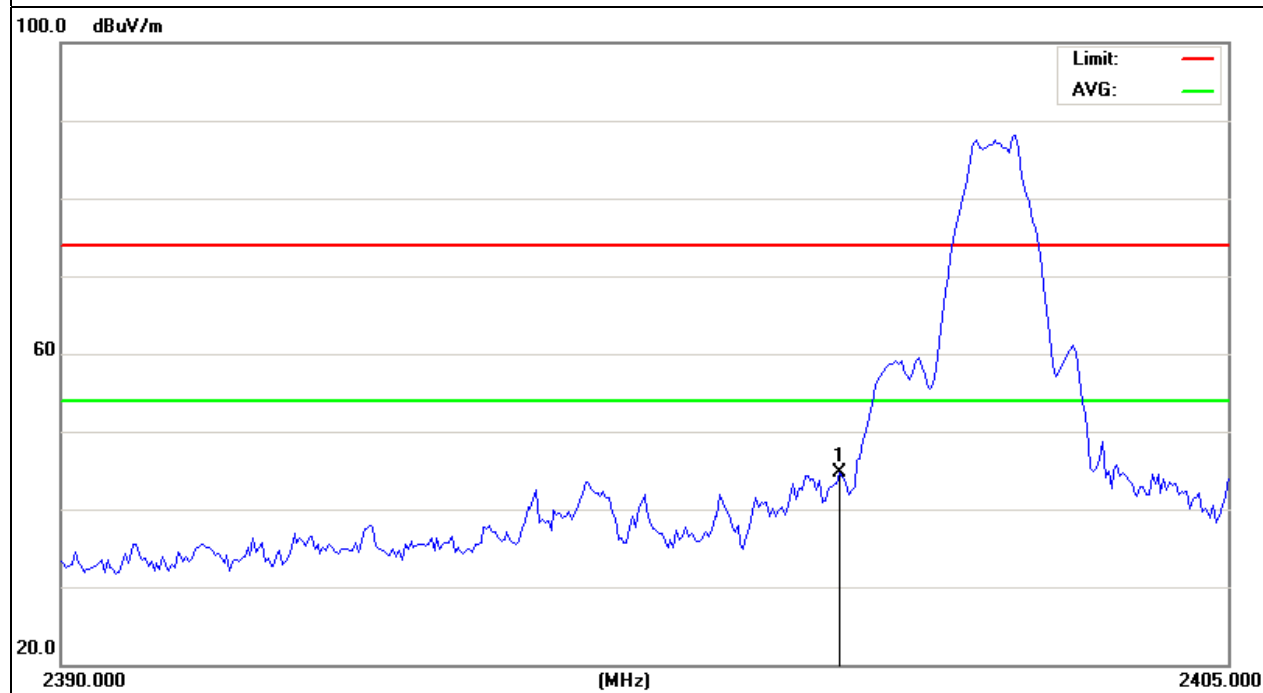


EUT :	Bluetooth controller	Model Name :	JSC-FA002
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC 3.7V
Test Mode :	TX /2402MHz-1Mbps	Polarization :	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2400	85.25	-40.5	44.75	74	-29.25	peak

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

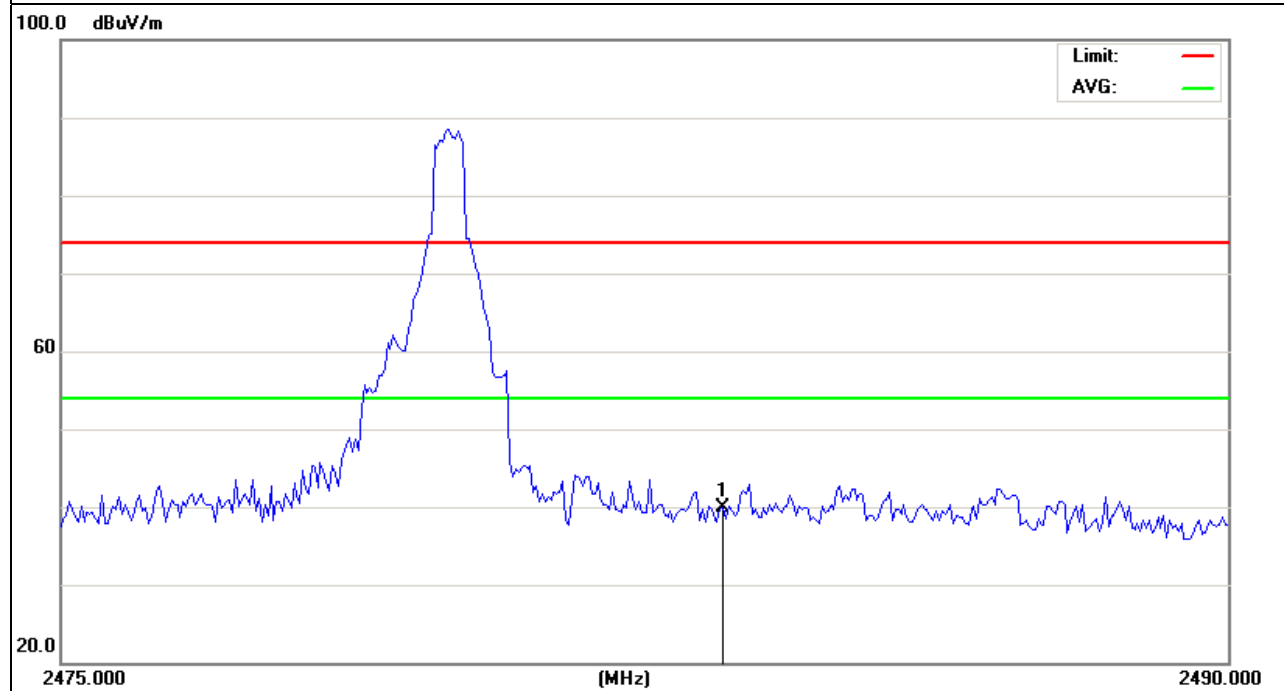


EUT :	Bluetooth controller	Model Name :	JSC-FA002
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC 3.7V
Test Mode :	TX /2480MHz-1Mbps	Polarization :	Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2483.5	80.43	-40.43	40	74	-34	peak

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

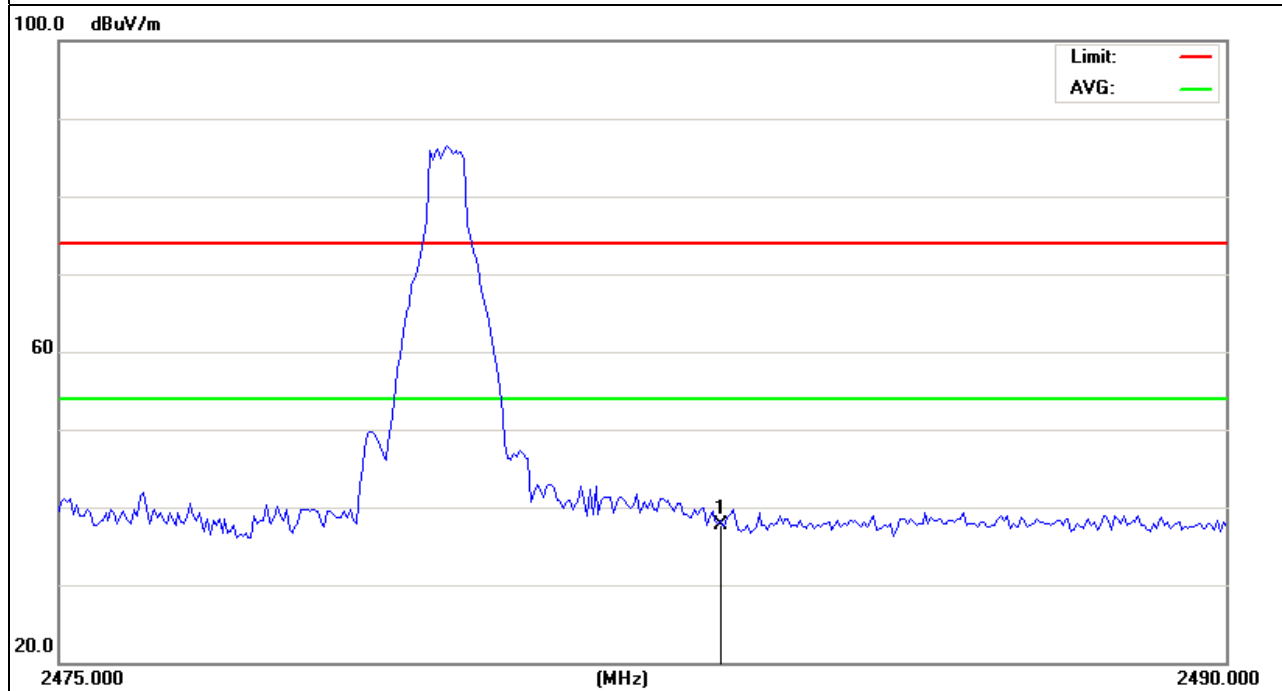


EUT :	Bluetooth controller	Model Name :	JSC-FA002
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC 3.7V
Test Mode :	TX /2480MHz-1Mbps	Polarization :	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2483.5	78.12	-40.43	37.69	74	-36.31	peak

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.



4. NUMBER OF HOPPING CHANNEL

4.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247 (a)(1)(iii)	Number of Hopping Channel	≥15	2400-2483.5	PASS

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	> Operating Frequency Range
RB	100 kHz
VB	100 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

4.1.1 TEST PROCEDURE

- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- Spectrum Setting : RBW= 100KHz, VBW=100KHz, Sweep time = Auto.

4.1.2 DEVIATION FROM STANDARD

No deviation.

4.1.3 TEST SETUP



4.1.4 EUT OPERATION CONDITIONS

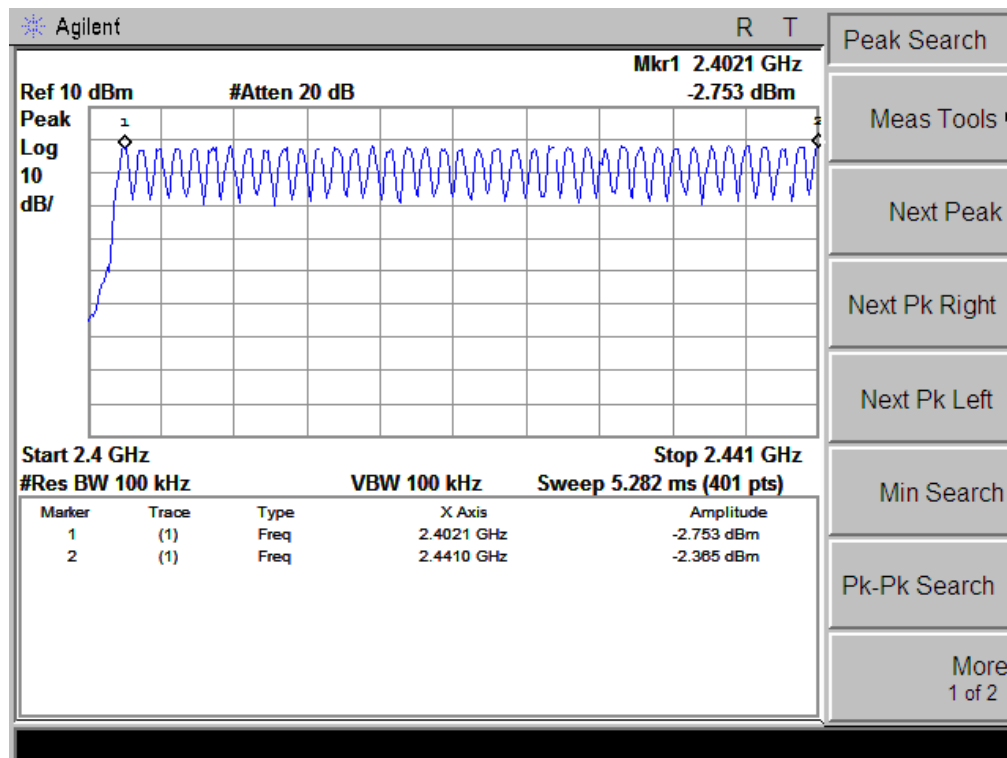
The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

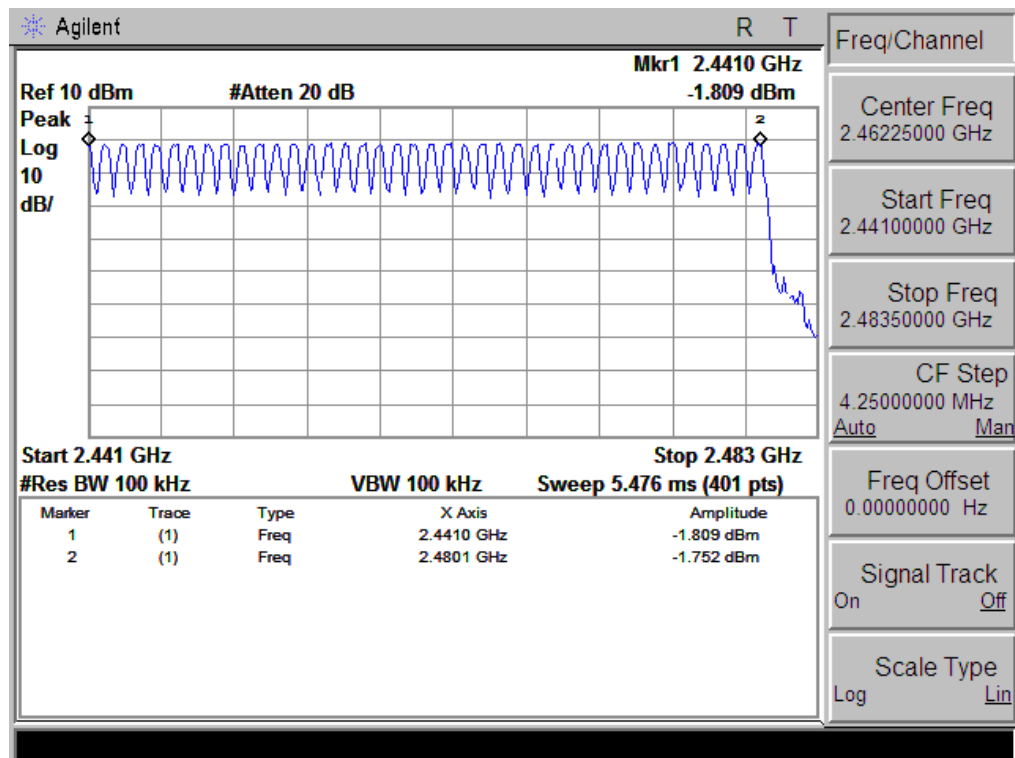
4.1.5 TEST RESULTS

EUT :	Bluetooth controller	Model Name :	JSC-FA002
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1015 hPa	Test Voltage :	DC 3.7V
Test Mode :	Hopping Mode		

Number of Hopping Channel	79
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FHSS Mode





5. AVERAGE TIME OF OCCUPANCY

5.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247 (a)(1)(iii)	Average Time of Occupancy	0.4sec	2400-2483.5	PASS

5.1.1 TEST PROCEDURE

- The transmitter output (antenna port) was connected to the spectrum analyzer
- Set RBW of spectrum analyzer to 1MHz and VBW to 1MHz.
- Use a video trigger with the trigger level set to enable triggering only on full pulses.
- Sweep Time is more than once pulse time.
- Set the center frequency on any frequency would be measure and set the frequency span to zero span.
- Measure the maximum time duration of one single pulse.
- Set the EUT for DH5, DH3 and DH1 packet transmitting.
- Measure the maximum time duration of one single pulse.
- A Period Time = (channel number)*0.4
 DH1 Time Slot: Reading * (1600/2)*31.6/(channel number)
 DH3 Time Slot: Reading * (1600/4)*31.6/(channel number)
 DH5 Time Slot: Reading * (1600/6)*31.6/(channel number)

5.1.2 DEVIATION FROM STANDARD

No deviation.

5.1.3 TEST SETUP



5.1.4 EUT OPERATION CONDITIONS

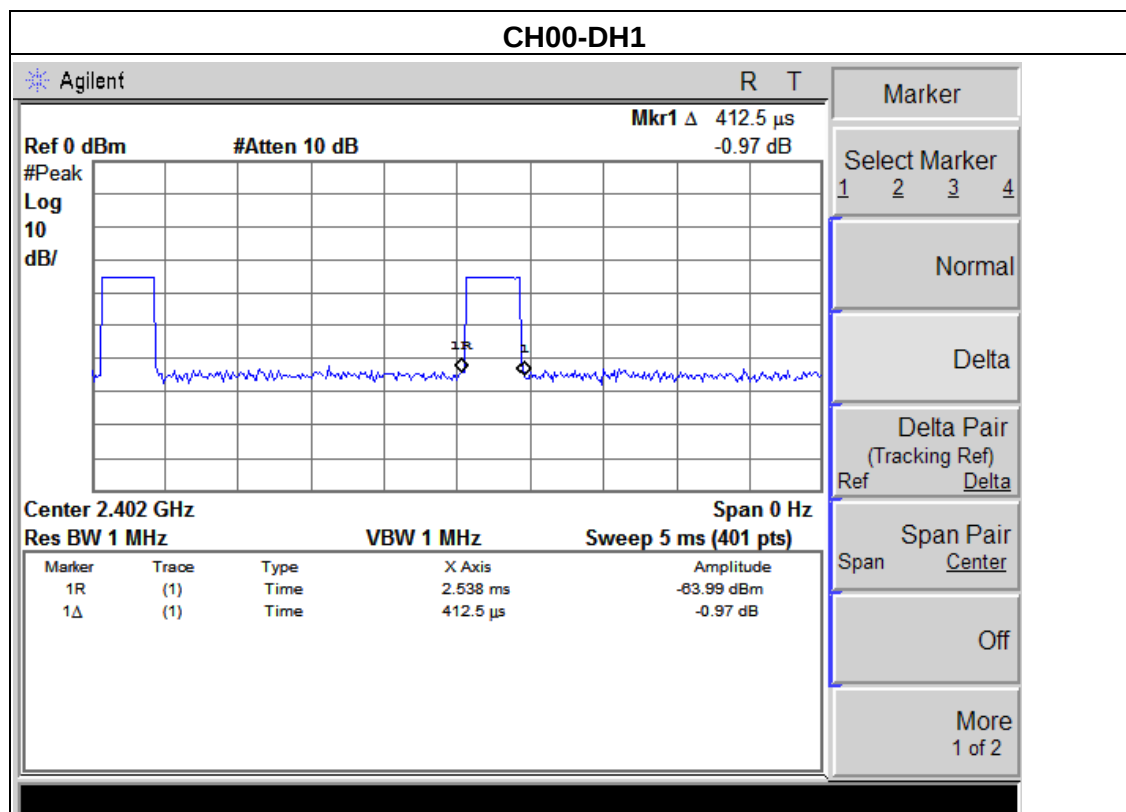
The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

5.1.5 TEST RESULTS

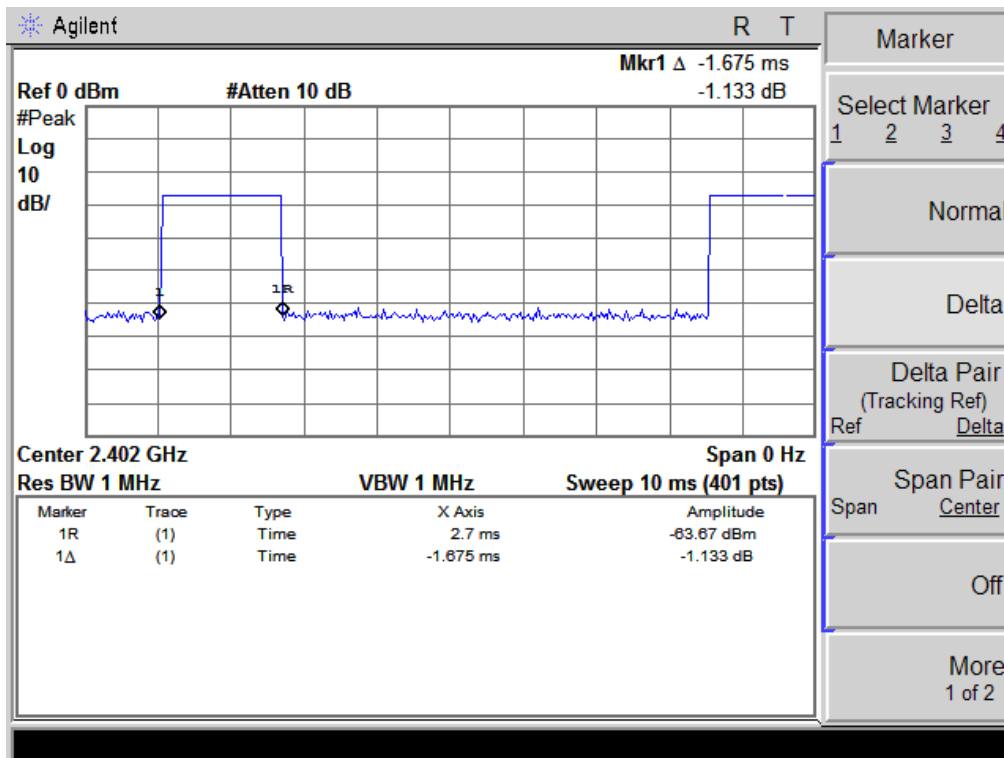
EUT :	Bluetooth controller	Model Name :	JSC-FA002
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1012 hPa	Test Voltage :	DC 3.7V
Test Mode :	CH00 - DH1, DH3 , DH5 (1Mbps Mode)		

NOTE :The dwell time is showed the maximum data of all data(DH1, DH3 , DH5) of mode have the maximum dwell time.

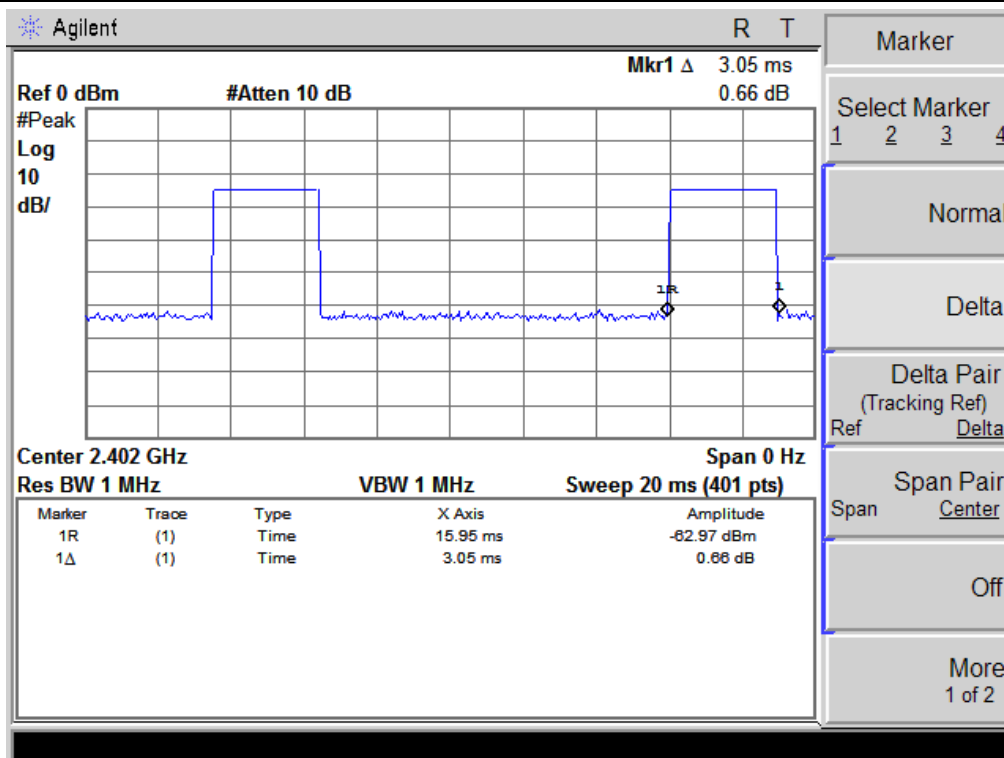
<i>Data packet</i>	<i>frequency (MHz)</i>	<i>pulse duration (ms)</i>	<i>dwell time (s)</i>	<i>limits (s)</i>
HD1	2402	0.412	0.13	0.4
DH3	2402	1.675	0.27	0.4
DH5	2402	3.05	0.33	0.4



CH00-DH3



CH00-DH5



6. HOPPING CHANNEL SEPARATION MEASUREMENT

6.1 APPLIED PROCEDURES / LIMIT

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.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	> Measurement Bandwidth or Channel Separation
RB	100 kHz (Channel Separation)
VB	300 kHz (Channel Separation)
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

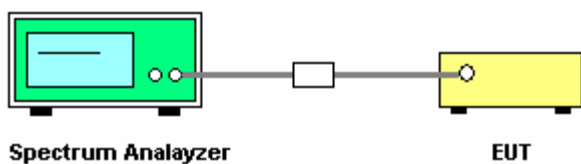
6.1.1 TEST PROCEDURE

- The transmitter output (antenna port) was connected to the spectrum analyser in peak hold mode.
- The resolution bandwidth of 100 kHz and the video bandwidth of 300 kHz were utilised for channel separation measurement.

6.1.2 DEVIATION FROM STANDARD

No deviation.

6.1.3 TEST SETUP



6.1.4 EUT OPERATION CONDITIONS

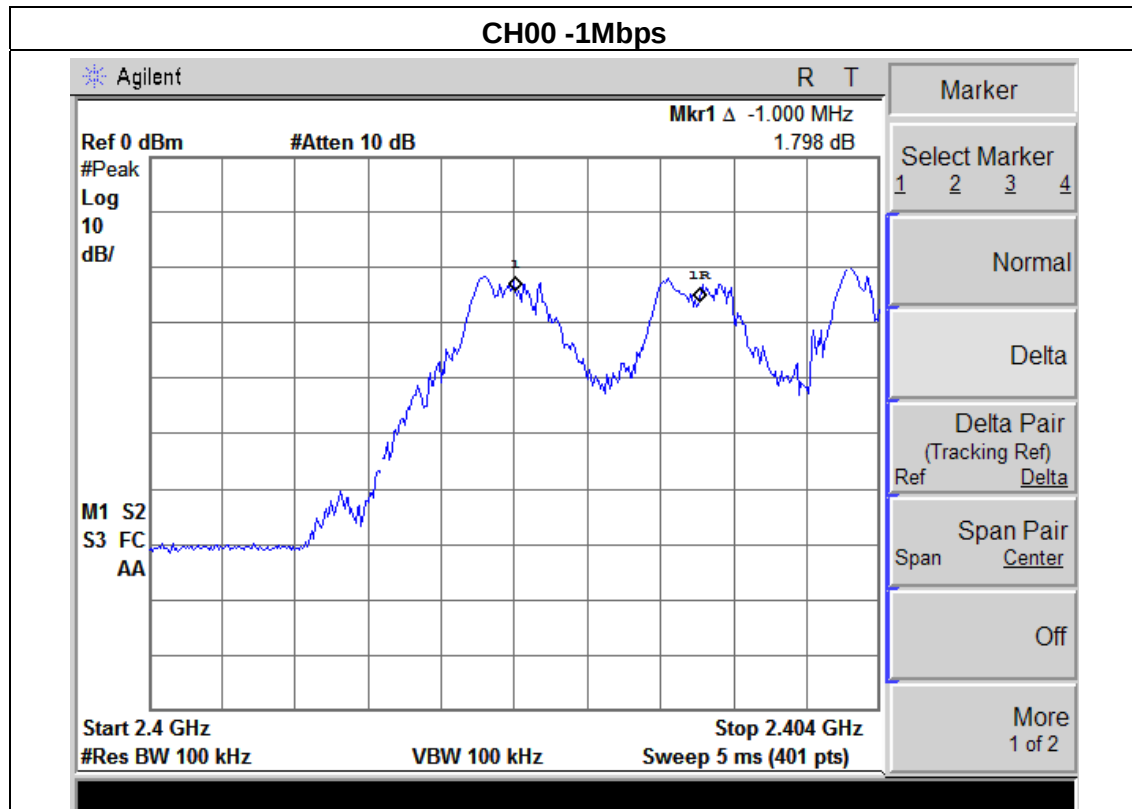
The EUT was programmed to be in continuously transmitting mode.

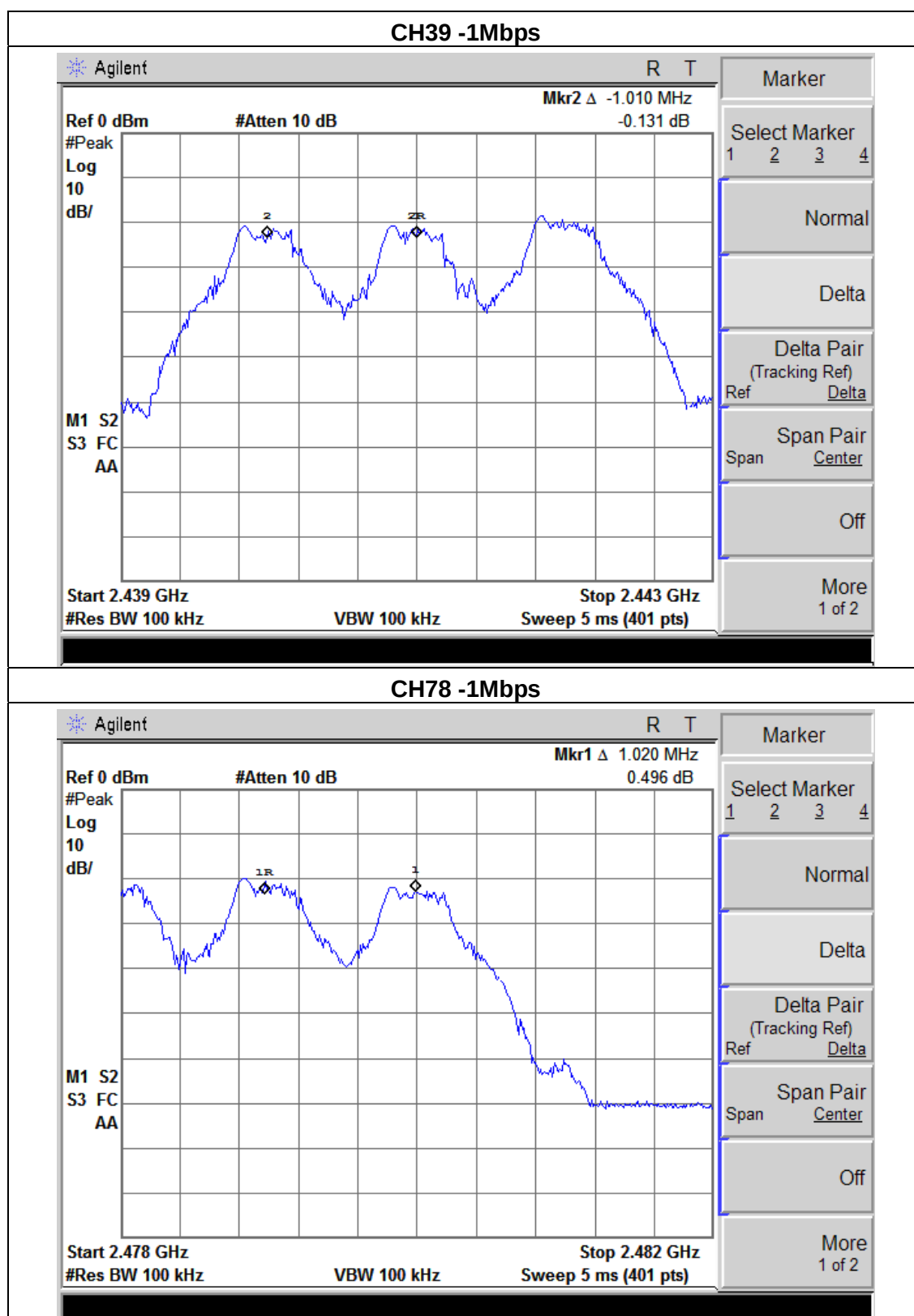
6.1.5 TEST RESULTS

EUT :	Bluetooth controller	Model Name :	JSC-FA002
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1012 hPa	Test Voltage :	DC 3.7V
Test Mode :	CH00 / CH39 /CH78 (1Mbps Mode)		

Frequency	Ch. Separation (MHz)	Result
2402 MHz	1.00	Complies
2441 MHz	1.01	Complies
2480 MHz	1.02	Complies

Ch. Separation Limits: >20dB bandwidth or >2/3 of 20dB bandwidth





7. BANDWIDTH TEST

7.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247 (a)(1)	Bandwidth	(20dB bandwidth)	2400-2483.5	PASS

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	> Measurement Bandwidth or Channel Separation
RB	30 kHz
VB	100 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

7.1.1 TEST PROCEDURE

- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- Spectrum Setting : RBW= 30KHz, VBW=100KHz, Sweep time = Auto.

7.1.2 DEVIATION FROM STANDARD

No deviation.

7.1.3 TEST SETUP



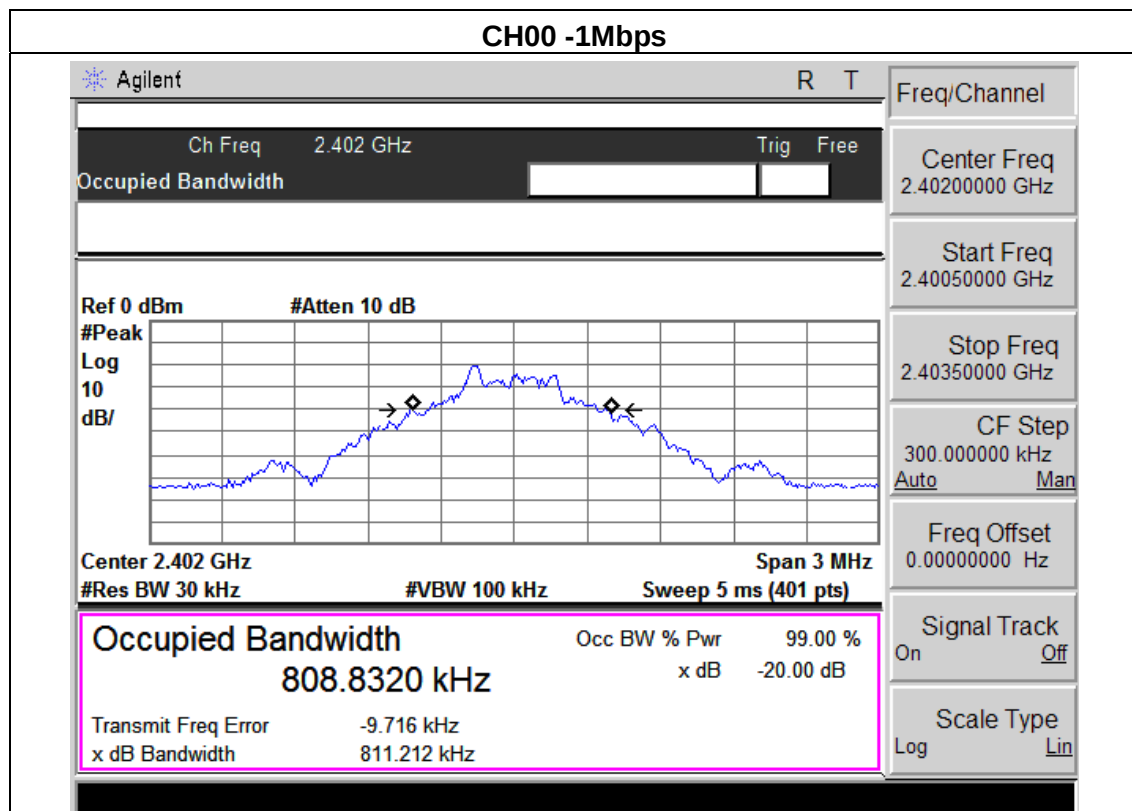
7.1.4 EUT OPERATION CONDITIONS

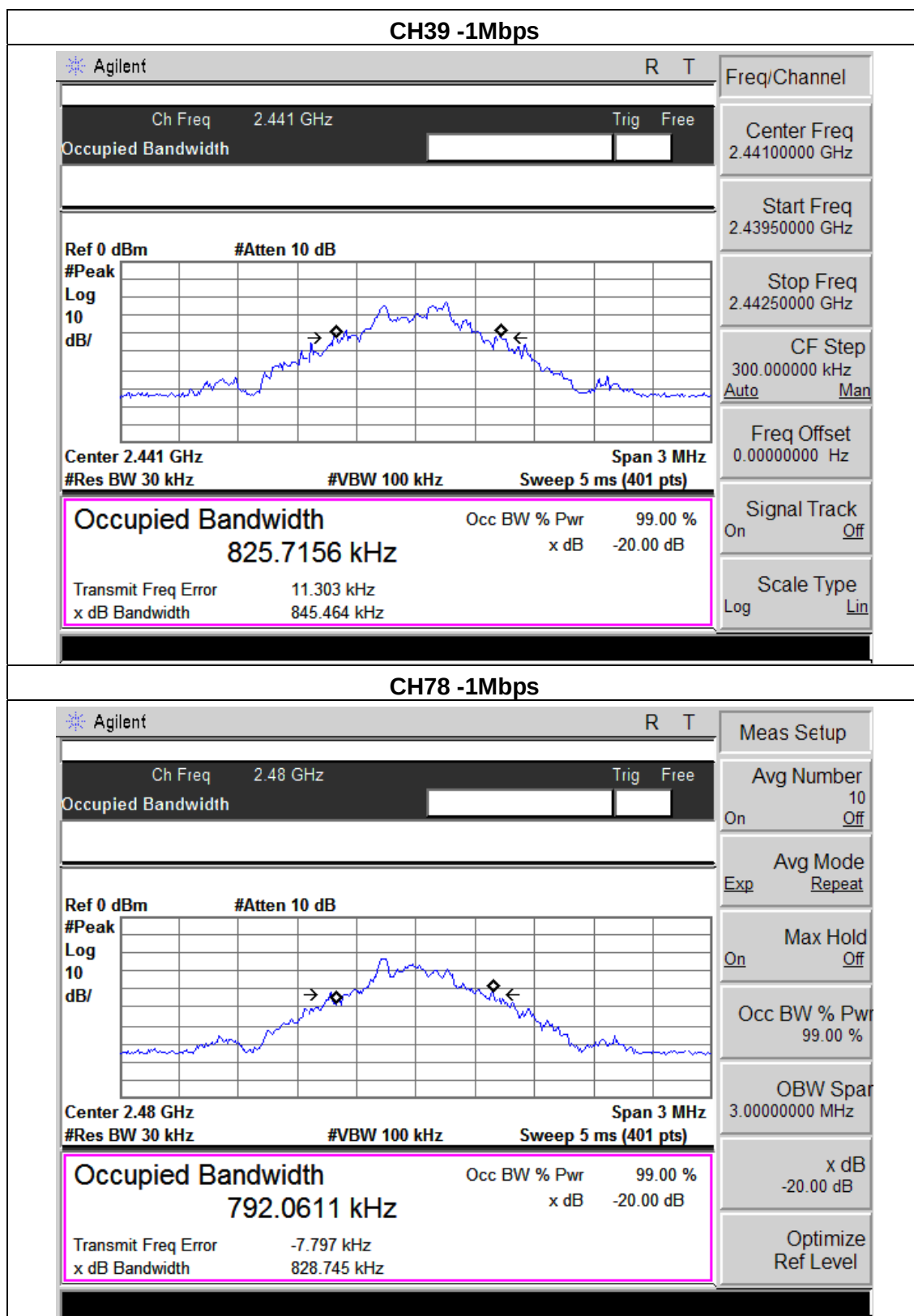
The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

7.1.5 TEST RESULTS

EUT :	Bluetooth controller	Model Name :	JSC-FA002
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1012 hPa	Test Voltage :	DC 3.7V
Test Mode :	CH00 / CH39 /C78(1Mbps)		

Frequency	20dB Bandwidth (kHz)	Result
2402 MHz	811.212	PASS
2441 MHz	845.464	PASS
2480 MHz	828.745	PASS





8. PEAK OUTPUT POWER TEST

8.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247 (b)(i)	Peak Output Power	0.125 w or 20.96dBm	2400-2483.5	PASS

8.1.1 TEST PROCEDURE

- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- Spectrum Setting : RBW > the 20 dB bandwidth of the emission being measured
 Span = approximately 5 times the 20 dB bandwidth, centered on a hopping channel
 VBW ≥ RBW
 Sweep = auto
 Detector function = peak
 Trace = max hold

8.1.2 DEVIATION FROM STANDARD

No deviation.

8.1.3 TEST SETUP



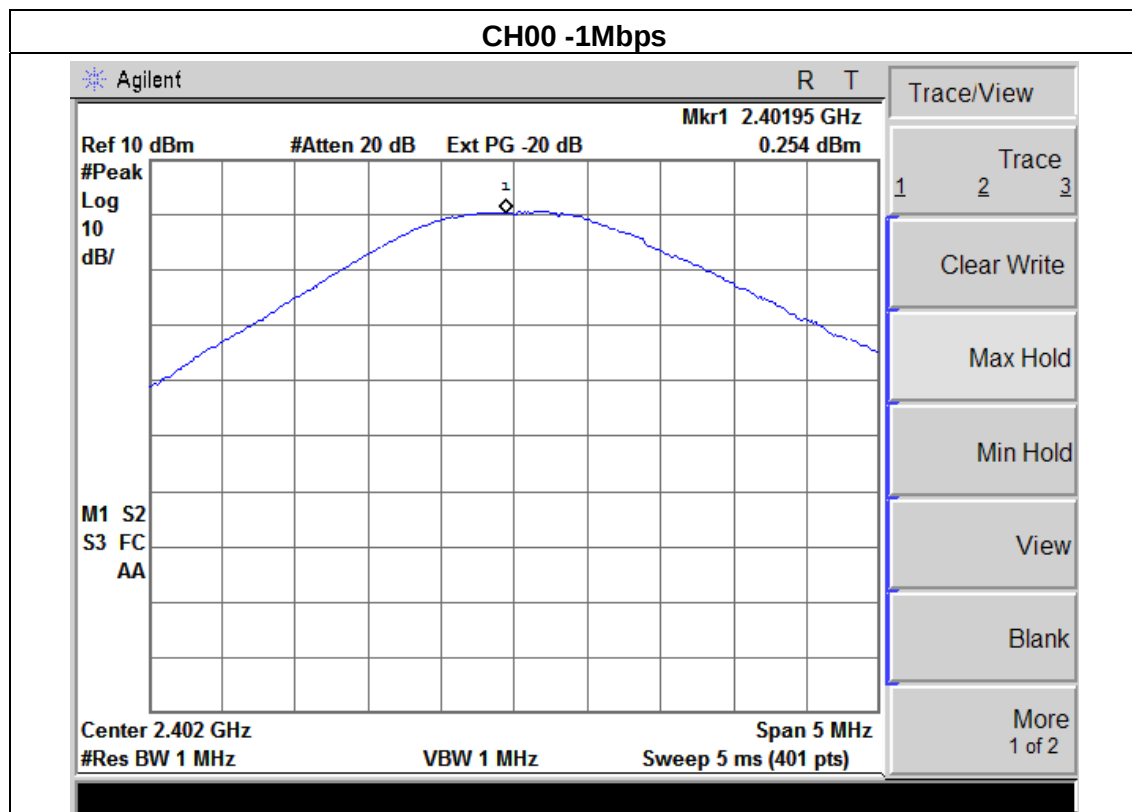
8.1.4 EUT OPERATION CONDITIONS

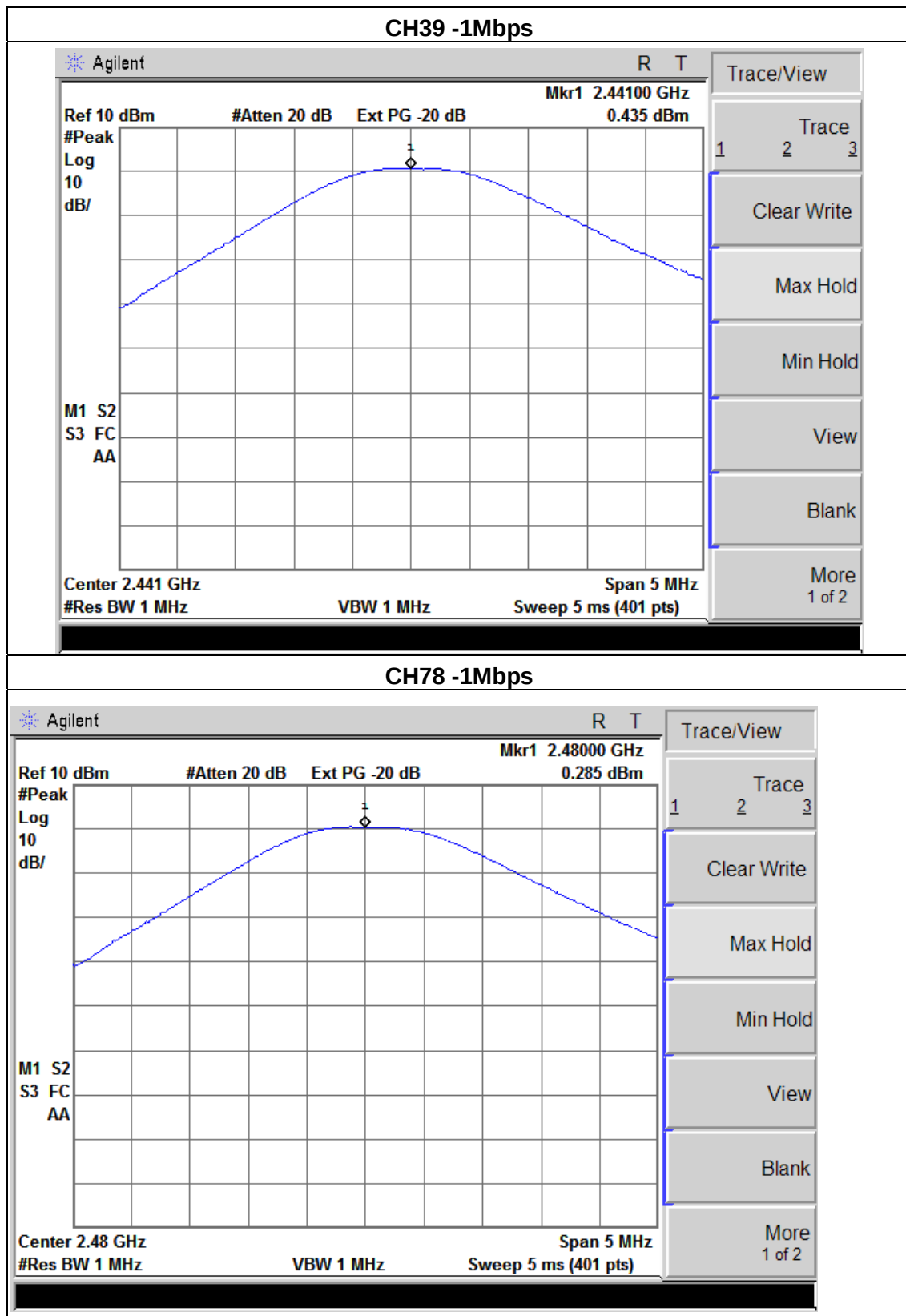
The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

8.1.5 TEST RESULTS

EUT :	Bluetooth controller	Model Name :	JSC-FA002
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1012 hPa	Test Voltage :	DC 3.7V
Test Mode :	CH00/ CH39 /CH78 (1M Mode)		

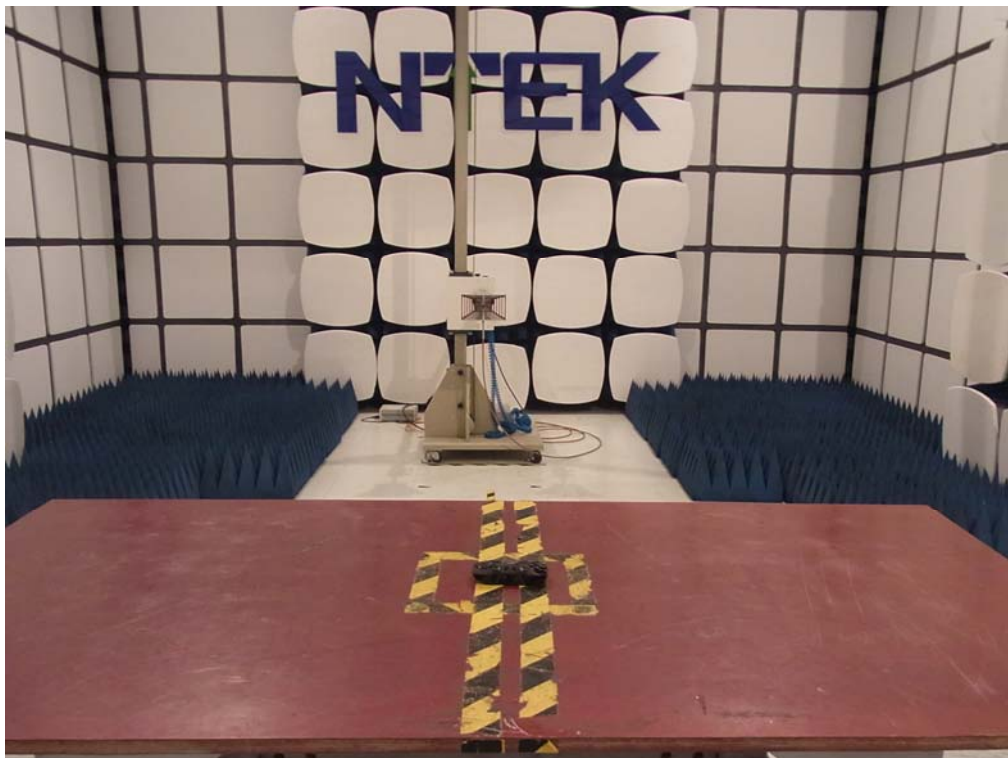
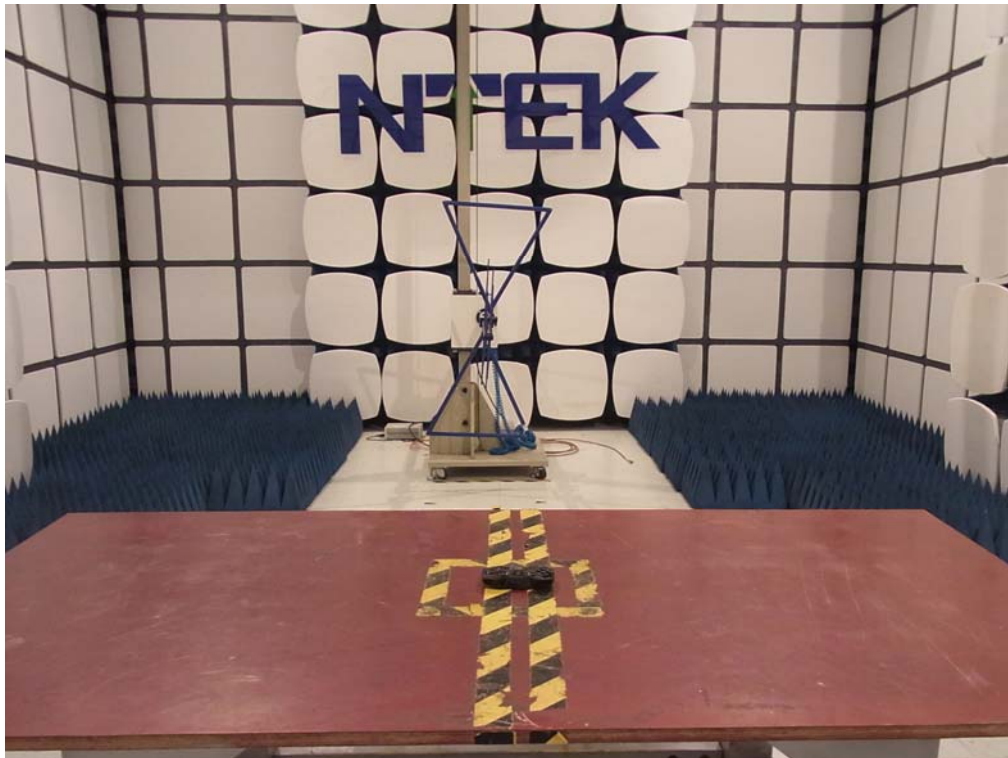
1Mbps			
Test Channel	Frequency (MHz)	Peak Output Power (dBm)	LIMIT (dBm)
CH00	2402	0.254	20.96
CH39	2441	0.435	20.96
CH78	2480	0.285	20.96





9. EUT TEST PHOTO

Radiated Measurement Photos



Conducted Measurement Photos

