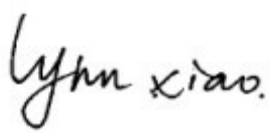

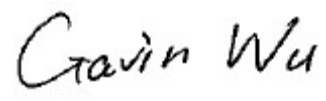




TEST REPORT

Report No.:	EM201300507-1	Application No.:	ZJ00031504
Client:	Harman International Industries, Incorporated		
Address:	8500 Balboa Blvd, Northridge, CA 91329, UNITED STATES		
Sample Description:	Wireless speaker dock for Lightning connector		
Model:	JBL ONBEAT HOTEL LT		
Adding Model:	/		
FCC ID	APIHOTEL		
Test Specification:	FCC Part 15,Subpart C:2012		
Test Date:	2013-07-29 to 2013-08-06		
Issue Date:	2013-08-06		
Test Result:	Pass.		
Prepared By:	Reviewed By:	Approved By:	
Lynn Xiao / Test Engineer	Jane Cao / Test Engineer	Gavin Wu / Manager	
			
Date:2013-08-06	Date:2013-08-06	Date:2013-08-06	
Other Aspects:			
This test report (report No.: EM201300507-1) is only valid with the original test report (report No.:EM201300383-1). Review this report and original report, this report just changed the apple's 30 pin original pretext into apple's new lightning connector, and added the rear plate of the video interface.			
Abbreviations: ok / P = passed; fail / F = failed; n.a. / N = not applicable			
The test result in this test report refers exclusively to the presented test sample. This report shall not be reproduced except in full, without the written approval of GRGT.			

DIRECTIONS OF TEST

1. This station carries out test task according to the national regulation of verifications which can be traced to National Primary Standards and BIPM.
2. 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.
3. If there is any objection concerning the test, the client should inform the laboratory within 15 days from the date of receiving the test report.

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1. TEST RESULT SUMMARY

Section B of FCC Part 15.247:2012			
Standard	Item	Limit / Severity	Result
FCC Part 15,Subpart C (15.247)	Maximum Peak Output Power	Section 15.247(b)(1)	PASS
	Conducted Emission	Section 15.207	PASS
	Radiated Spurious Emission (9kHz to 25GHz)	Section 15.209 &15.247(d)	PASS
	Band Edges Measurement	Section 15.247 (d) &15.205	PASS

Model No.: JBL ONBEAT HOTEL LT

This test report (report No.: EM201300507-1) is only valid with the original test report(report No.:EM201300383-1) .

Review this report and original report, this report just changed the apple's 30 pin original pretext into apple's new lightning connector, and added the rear plate of the video interface.

Considering to the difference, pre-scan were performed on the sample in this report to find the items which can be influential to the result in the original test report for fully retest.

Therefore in this report **AC power line conducted emission, conducted peak output power, radiated spurious emission and band edge(radiated emission)** were fully retested on model: JBL ONBEAT HOTEL LT and shown the data in this report, other tests please refer to original report EM201300383-1.

2. GENERAL DESCRIPTION OF EUT

2.1 APPLICANT

Name: Harman International Industries, Incorporated
Address: 8500 Balboa Blvd, Northridge, CA 91329, UNITED STATES

2.2 MANUFACTURER

Name: Harman International Industries, Incorporated
Address: 8500 Balboa Blvd, Northridge, CA 91329, UNITED STATES

2.3 BASIC DESCRIPTION OF EQUIPMENT UNDER TEST

Equipment: Wireless speaker dock for Lightning connector
Model No.: JBL ONBEAT HOTEL LT
Trade Name: JBL
Power supply /
AC Adapter: Model: KSA0451300323D5
Input: AC 100-240V~50/60Hz,78~93VA 1.2A
Output: DC 13V 3.23A
Frequency Range 2402MHz~2480MHz
Type of Modulation GFSK, 8DPSK, Pi/4 QPSK
Channels: Channels with 1MHz step
2402MHz: 3.75dBi
Antenna gain: 2441MHz: 3.53dBi
2480MHz: 3.46dBi
Antenna Type PCB antenna

3. LABORATORY AND ACCREDITATIONS

3.1 LABORATORY

The tests and measurements refer to this report were performed by Guangzhou GRG Metrology and Test CO., LTD.

Add. : 163 Pingyun Rd, West of Huangpu Ave, Guangzhou, 510656, P. R. China

Telephone: +86-20-38699959, 38699960, 38699961

Fax : +86-20-38695185

3.2 ACCREDITATIONS

Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025.

USA	FCC Listed Lab (No. 688188)
China	CNAS (No.L0446)
China	DILAC (No.DL175)
Canada	Registration No.:8355A-1

3.3 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement		Frequency	Uncertainty
Radiated Emission		9kHz~30MHz	3.9dB
Radiated Emission	Horizontal	30MHz~1000MHz	4.2dB
		1GHz~26.5GHz	4.2dB
	Vertical	30MHz~1000MHz	4.4dB
		1GHz~26.5GHz	4.4dB
Conducted Emission		150kHz~30MHz	3.1 dB

This uncertainty represents an expanded uncertainty factor of $k=2$ and the Confidence Level is 95%.

3.4 LIST OF USED TEST EQUIPMENT AT GRGT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
6 dB bandwidth/ carrier frequencies separated/ hopping channel number/ dwell time/ maximum peak output power/100kHz bandwidth of frequency band edge/ Spurious Emissions at Antenna Port/ Restricted Bands				
Receiver	R&S	ESU40	100106	2014-01-24
Conducted Emissions				
EMI Receiver	R&S	ESU40	100529	2014-01-24
L.I.S.N	SCHWARZBECK	NSLK 8127	8127450	2014-08-05
Radiated Spurious Emissions				
Receiver	R&S	ESU40	100106	2014-01-24
Loop antenna	R&S	HFH2-Z2	881058/58	2014-05-26
Biconical Log-periodic Antenna	ETS.LINDGREN	3142C	00075971	2014-05-26
Horn antenna	SCHWARZBECK	BBHA9120D	D752	2014-10-14
Horn antenna	SCHWARZBECK	BBHA 9170	411	2014-11-21
Pre-amplifier	SCHWARZBECK	9742	332	2014-09-20
Pre-amplifier	Decentest	DC7110EMA	001	2014-10-10

NOTE: The calibration interval of the above test instruments is 12 months.

4. TEST RESULTS

4.1 E.U.T. TEST CONDITIONS

Type of antenna: Integral

Temperature: 22.0 °C

Humidity: 54 % RH

Atmospheric Pressure: 1011 mbar

Test frequencies: According to the 15.31(m) Measurements on intentional radiators or receivers, other than TV broadcast receivers, shall be performed and, if required, reported for each band in which the device can be operated with the device operating at the number of frequencies in each band specified in the following table:

Frequency range over which device operates	Number of frequencies	Location in the range of operation
1 MHz or less	1	Middle
1 to 10 MHz	2	1 near top and 1 near bottom
More than 10 MHz	3	1 near top, 1 near middle and 1 near bottom

EUT channels and frequencies list:

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2402	14	2416	28	2430
1	2403	15	2417	29	2431
2	2404	16	2418	30	2432
3	2405	17	2419	31	2433
4	2406	18	2420	32	2434
5	2407	19	2421	33	2435
6	2408	20	2422	34	2436
7	2409	21	2423	35	2437
8	2410	22	2424	36	2438
9	2411	23	2425	37	2439
10	2412	24	2426	38	2440
11	2413	25	2427	39	2441
12	2414	26	2428	40	2442
13	2415	27	2429	41	2443

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
42	2444	55	2457	68	2470
43	2445	56	2458	69	2471
44	2446	57	2459	70	2472
45	2447	58	2460	71	2473
46	2448	59	2461	72	2474
47	2449	60	2462	73	2475
48	2450	61	2463	74	2476
49	2451	62	2464	75	2477
50	2452	63	2465	76	2478
51	2453	64	2466	77	2479
52	2454	65	2467	78	2480
53	2455	66	2468		
54	2456	67	2469		

Test frequency is the lowest channel: 0 channel(2402MHz), middle channel: 39 channel(2441MHz) and highest channel: 78 channel(2480MHz)

4.2 CONDUCTED EMISSION MEASUREMENT

4.2.1 LIMITS

Frequency range	Limits (dB μ V)	
	Quasi-peak	Average
150kHz ~ 0.5MHz	66~56	56~46
0.5 MHz ~ 5 MHz	56	46
5 MHz ~ 30 MHz	60	50

4.2.2 TEST PROCEDURES

Procedure of Preliminary Test

For measurement of the disturbance voltage the equipment under test (EUT) is connected to the power supply mains and any other extended network via one or more artificial network(s). An EUT, whether intended to be grounded or not, and which is to be used on a table is configured as follows:

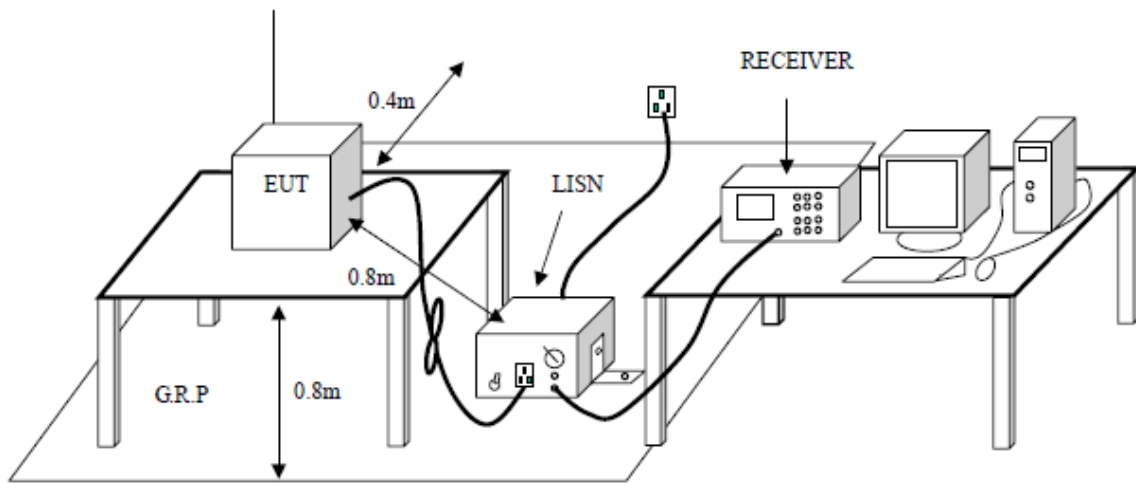
- Either the bottom or the rear of the EUT shall be at a controlled distance of 40 cm from a reference ground plane. This ground plane is normally the wall or floor of a shielded room. It may also be a grounded metal plane of at least 2 m by 2 m. This is physically accomplished as follows:
 - 1) place the EUT on a table of non-conducting material which is at least 80 cm high. Place the EUT so that it is 40 cm from the wall of the shielded room, or
 - 2) place the EUT on a table of non-conducting material which is 40 cm high so that the bottom of the EUT is 40 cm above the ground plane;
- All other conductive surfaces of the EUT shall be at least 80 cm from the reference ground plane;
- The EUT are placed on the floor that one side of the housings is 40 cm from the vertical reference ground plane and other metallic parts;
- Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth forming a bundle 30 cm to 40 cm long, hanging approximately in the middle between the ground plane and the table.
- I/O cables that are connected to a peripheral shall be bundled in the centre. The end of the cable may be terminated if required using correct terminating impedance. The total length shall not exceed 1 m.

The test mode(s) described in Item 2.4 were scanned during the preliminary test. After the preliminary scan, we found the test mode described in Item 2.4 producing the highest emission level. The EUT configuration and cable configuration of the above highest emission levels were recorded for reference of the final test.

Procedure of Final Test

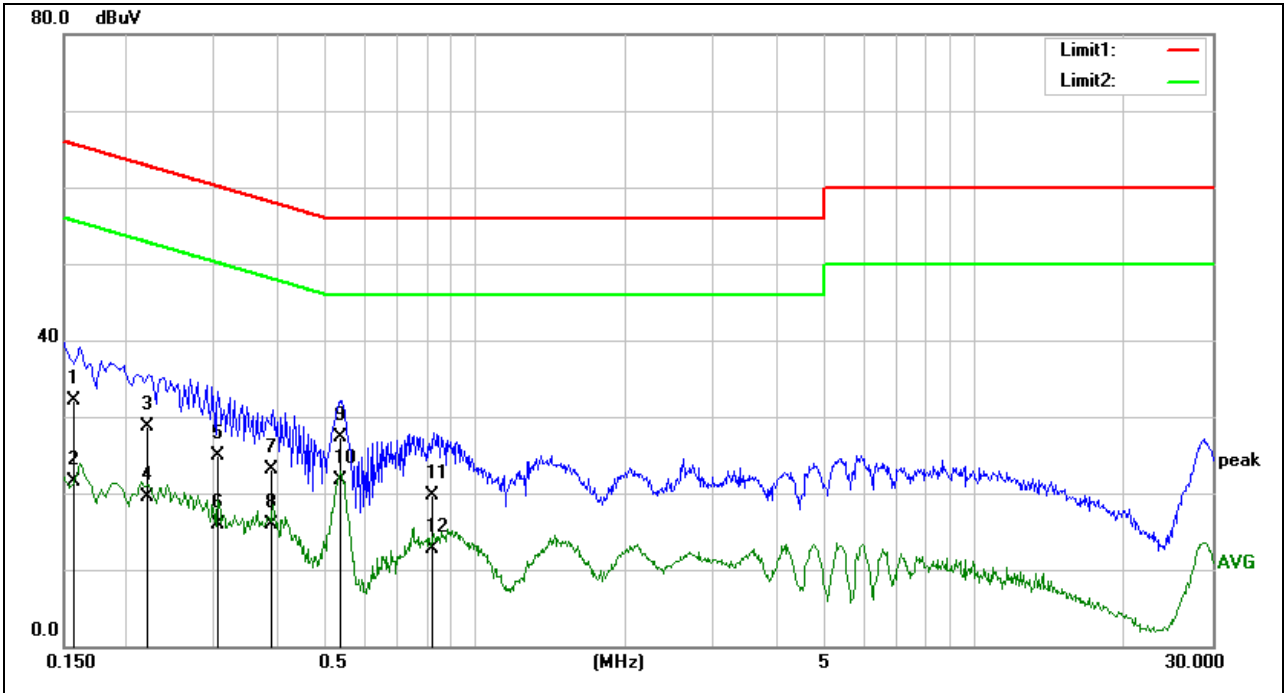
EUT and support equipment were set up on the test bench as per the configuration with highest emission level in the preliminary test. A scan was taken on both power lines, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. The test data of the worst-case condition(s) was recorded.

4.2.3 TEST SETUP



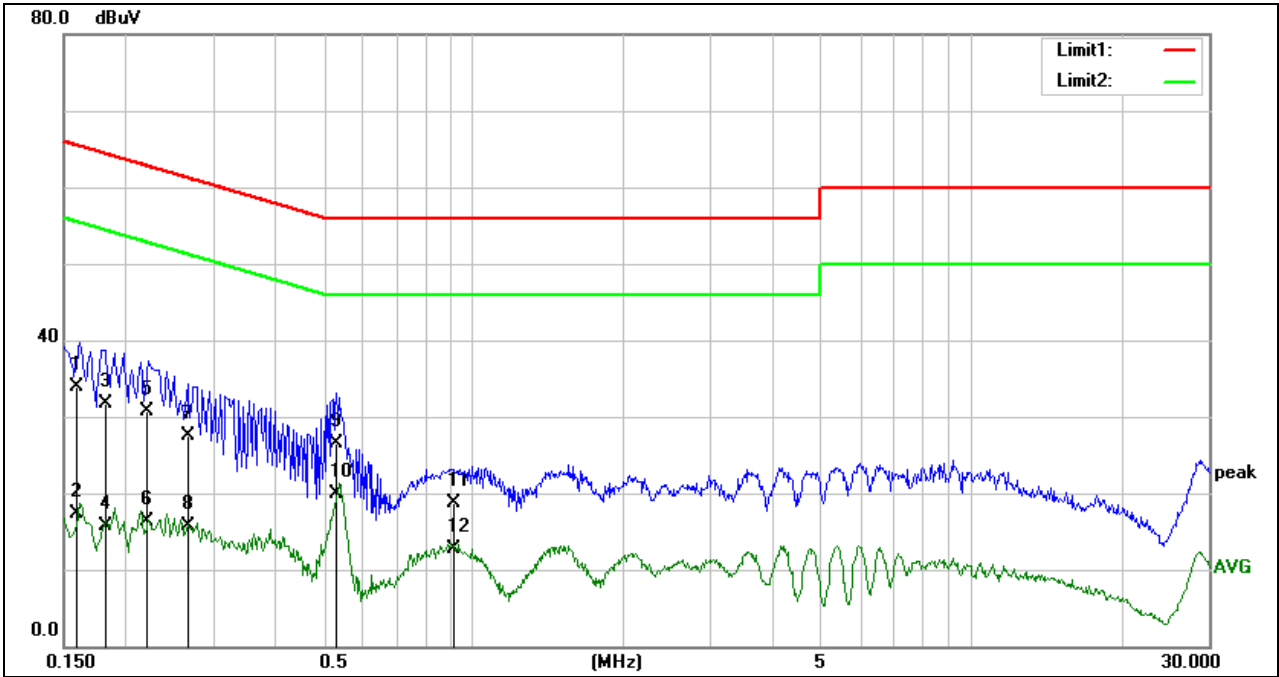
4.2.4 TEST RESULTS

Project No.:	ZJ00031504	Probe:	L1
Standard:	(CE)FCC PART 15 class B_QP	Power Source:	AC 120V/60Hz
Test item:	Conduction Test	Date:	2013-7-30
Temp./Hum.(%RH):	21/56%RH	Time:	21:00:07
EUT:	Wireless speaker dock for Lighting	Test Result:	Pass
Model:	JBL ONBEAT HOTEL LT		
Note:			



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1576	31.52	0.49	32.01	65.58	-33.57	QP
2	0.1576	21.04	0.49	21.53	55.58	-34.05	AVG
3	0.2199	28.16	0.47	28.63	62.82	-34.19	QP
4	0.2199	19.01	0.47	19.48	52.82	-33.34	AVG
5	0.3038	24.49	0.50	24.99	60.14	-35.15	QP
6	0.3038	15.47	0.50	15.97	50.14	-34.17	AVG
7	0.3905	22.65	0.51	23.16	58.05	-34.89	QP
8	0.3905	15.40	0.51	15.91	48.05	-32.14	AVG
9	0.5381	26.73	0.51	27.24	56.00	-28.76	QP
10	0.5381	21.12	0.51	21.63	46.00	-24.37	AVG
11	0.8209	19.33	0.47	19.80	56.00	-36.20	QP
12	0.8209	12.16	0.47	12.63	46.00	-33.37	AVG

Project No.:	ZJ00031504	Probe:	N
Standard:	(CE)FCC PART 15 class B_QP	Power Source:	AC 120V/60Hz
Test item:	Conduction Test	Date:	2013-7-30
Temp./Hum.(%RH):	21/56%RH	Time:	21:06:11
EUT:	Wireless speaker dock for Lighting	Test Result:	Pass
Model:	JBL ONBEAT HOTEL LT		
Note:			



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1590	33.41	0.51	33.92	65.51	-31.59	QP
2	0.1590	16.80	0.51	17.31	55.51	-38.20	AVG
3	0.1827	31.15	0.52	31.67	64.36	-32.69	QP
4	0.1827	15.10	0.52	15.62	54.36	-38.74	AVG
5	0.2202	30.19	0.47	30.66	62.81	-32.15	QP
6	0.2202	15.83	0.47	16.30	52.81	-36.51	AVG
7	0.2652	27.09	0.50	27.59	61.26	-33.67	QP
8	0.2652	15.14	0.50	15.64	51.26	-35.62	AVG
9	0.5307	25.98	0.51	26.49	56.00	-29.51	QP
10	0.5307	19.41	0.51	19.92	46.00	-26.08	AVG
11	0.9171	18.24	0.46	18.70	56.00	-37.30	QP
12	0.9171	12.21	0.46	12.67	46.00	-33.33	AVG

4.3 MAXIMUM PEAK OUTPUT POWER

4.3.1 LIMITS

Regulation 15.247 (b)(1) For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts. Refer to the result “Hopping channel number” of this document. The 1 watt (30.0dBm) limit applies.

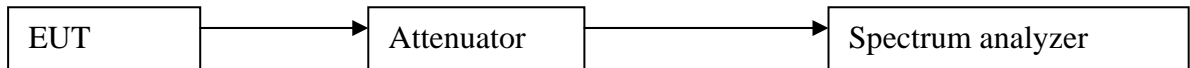
4.3.2 TEST PROCEDURES

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW = 3 MHz. VBW = 3 MHz. Sweep = auto; Detector Function = Peak.
3. Keep the EUT in transmitting at lowest, medium and highest channel individually. Record the max value.

Remark:

1. Pre-test the 3 modulation to find GFSK and 8DPSK is worse case, so only record GFSK and 8DPSK test data.
2. Cable loss = 3.5dB, the receiver offset loss 3.5dB.

4.3.3 TEST SETUP



4.3.4 TEST RESULTS

For GFSK:

Test Channel	Fundamental Frequency (GHz)	Max Output Power(dBm)	Limit (dBm)	Pass/Fail
Lowest	2.402	5.64	30.0	Pass
Middle	2.441	4.69	30.0	Pass
Highest	2.480	3.45	30.0	Pass

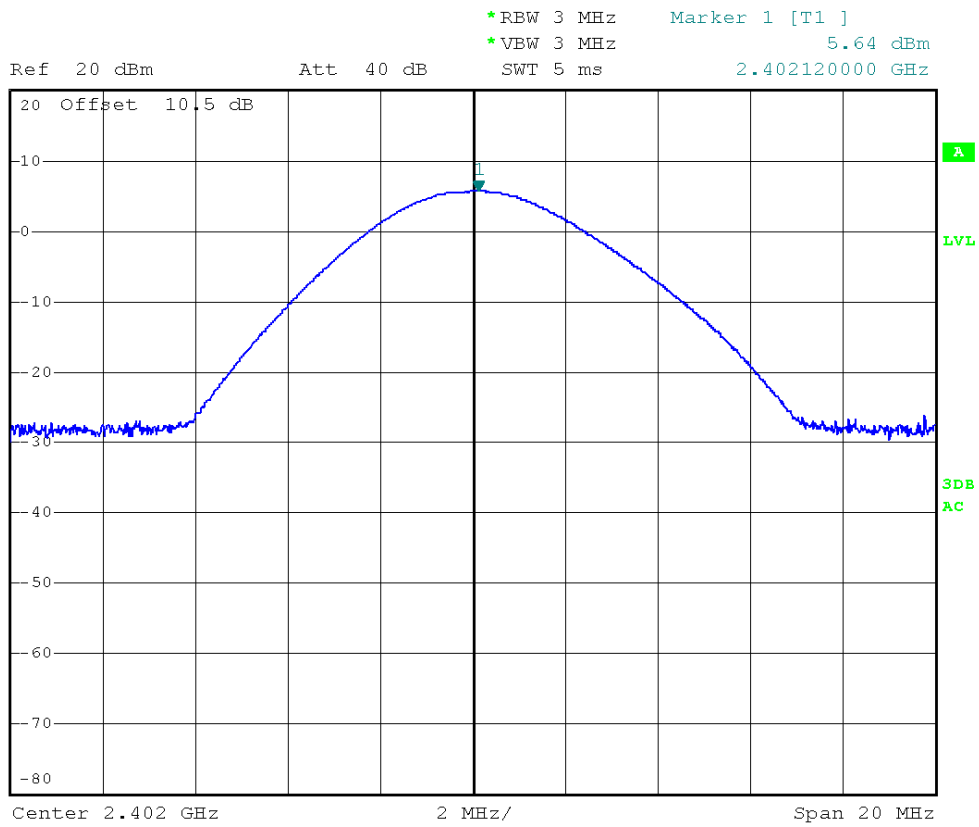
For 8DPSK:

Test Channel	Fundamental Frequency (GHz)	Max Output Power(dBm)	Limit (dBm)	Pass/Fail
Lowest	2.402	4.27	30.0	Pass
Middle	2.441	3.90	30.0	Pass
Highest	2.480	2.61	30.0	Pass

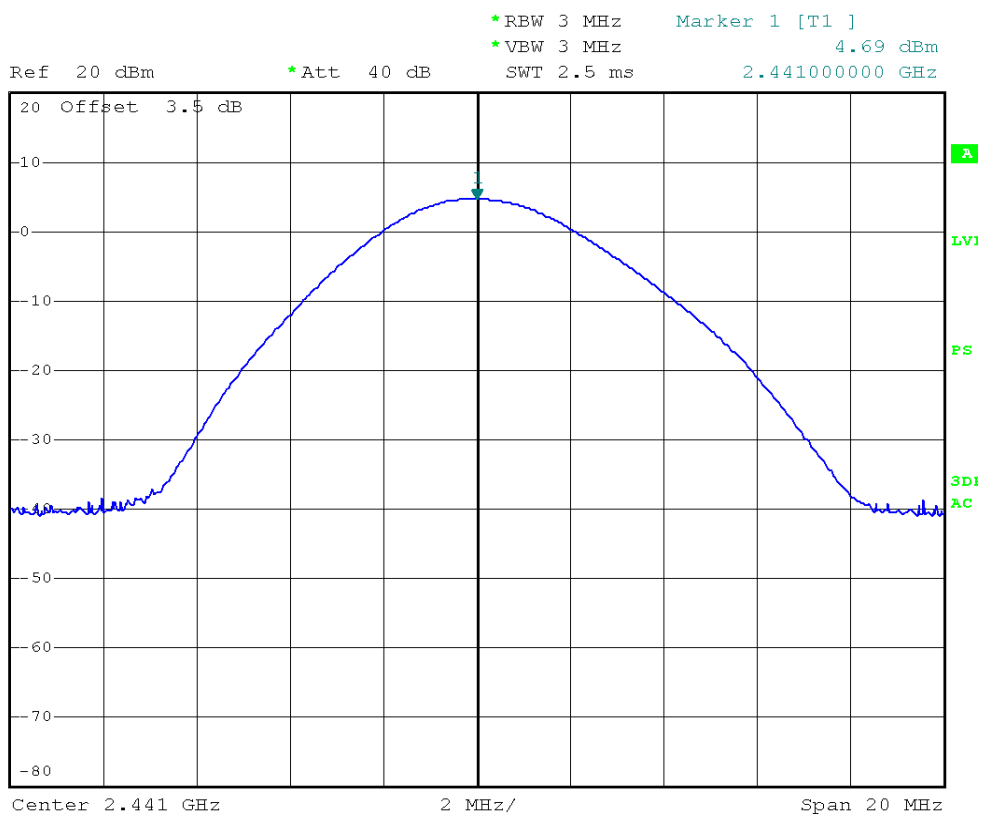
Test result: The unit does meet the FCC requirements.

Test result plot as follows:

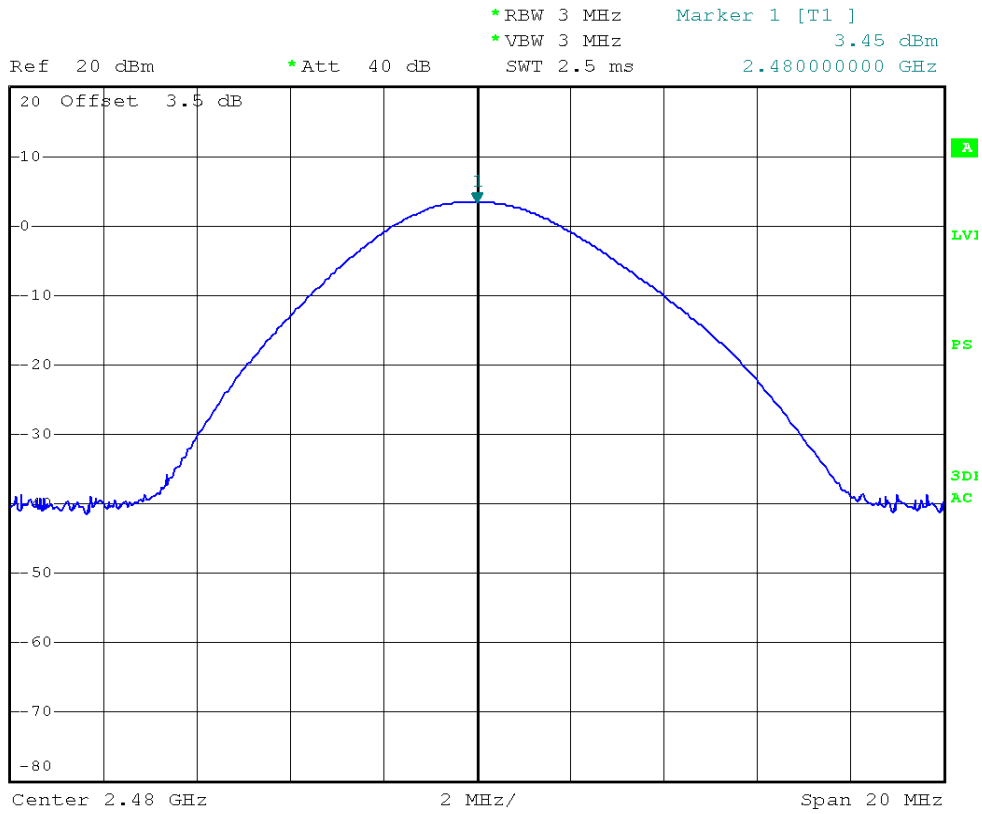
GFSK Lowest Channel:



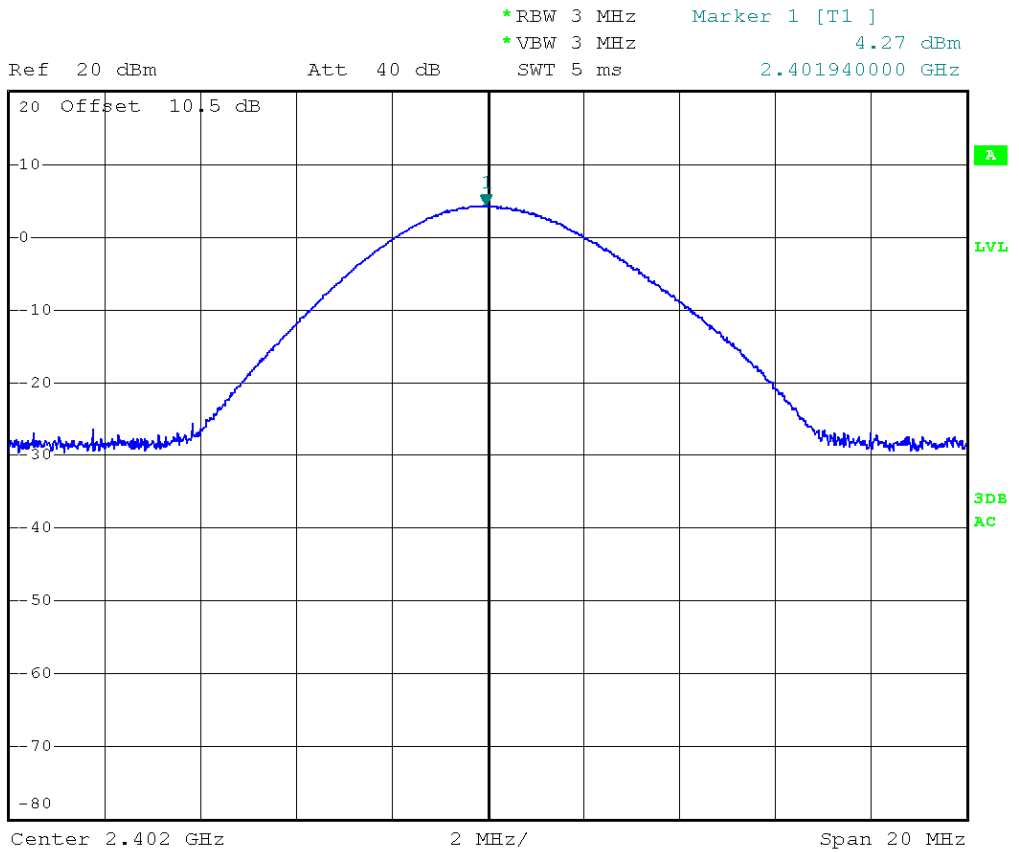
GFSK Middle Channel:



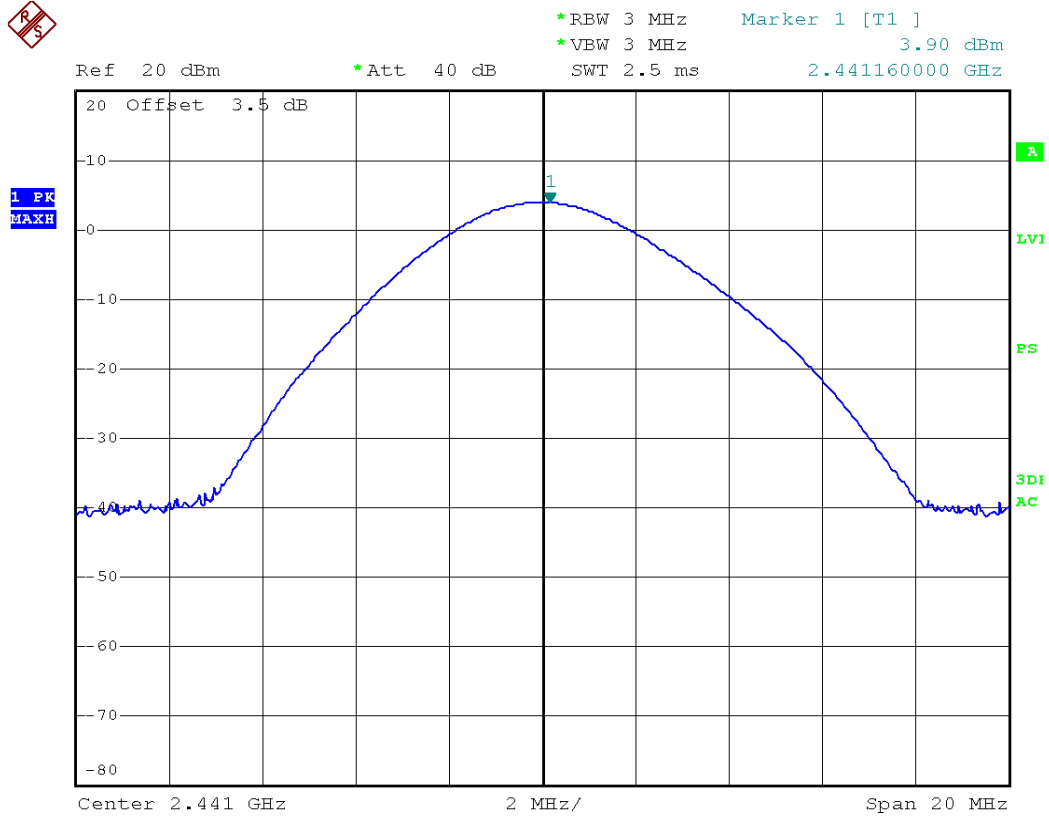
GFSK Highest Channel:



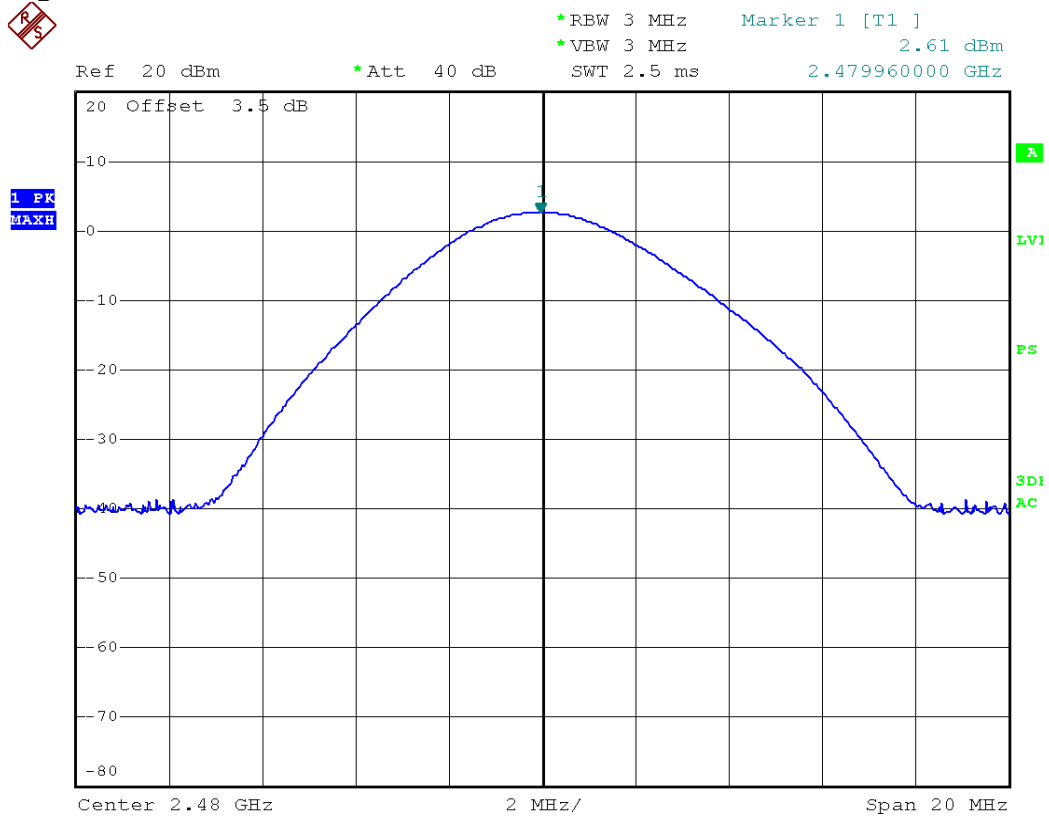
8DPSK Lowest Channel:



8DPSK Middle Channel:



8DPSK Highest Channel:



4.4 RADIATED SPURIOUS EMISSIONS

4.4.1 LIMITS

Frequency (MHz)	Quasi-peak(μ V/m)	Measurement distance(m)	Quasi-peak(dB μ V/m)@distance 3m
0.009-0.490	2400/F(kHz)	300	53.8~88.5
0.490-1.705	24000/F(kHz)	30	43~53.8
1.705-30.0	30	30	49.5
30 ~ 88	100	3	40
88~216	150	3	43.5
216 ~ 960	200	3	46
Above 960	500	3	54

NOTE: (1) The lower limit shall apply at the transition frequencies.

Frequency (GHz)	limit(dB μ V/m)
1 ~ 26.5	PEAK:74
1~ 26.5	AVG:54

4.4.2 TEST PROCEDURES

Procedure of Preliminary Test

According to ANSI C63.10:2009, a calibrated, linearly polarized antenna shall be positioned at the specified distance from the periphery of the EUT. The specified distance is the distance between the horizontal projection onto the ground plane of the closest periphery of the EUT and the projection onto the ground plane of the center of the axis of the elements of the receiving antenna.

Measurements shall be made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna shall be varied in height above the reference ground plane to obtain the maximum signal strength. Unless otherwise specified, the measurement distance shall be 3 m. At any measurement distance, the antenna height shall be varied from 1 m to 4 m.

These height scans apply for both horizontal and vertical polarizations, except that for vertical polarization, the minimum height of the center of the antenna shall be increased so that the lowest point of the bottom of the lowest antenna element clears the site reference ground plane by at least 25 cm. For a tuned dipole, the minimum heights as measured from the center of the antenna are those specified in the NSA measurement requirements.

For tabletop systems, cables or wires should be manipulated within the range of likely arrangements. For floor-standing equipment, the cables or wires should be located in the same manner as the user would install them and no further manipulation is made. For combination EUTs, the tabletop and floor-standing portions of the EUT shall follow the procedures for their respective setups and cable manipulation.

Table-top equipment is placed on a non-conductive set-up table with height $0,8\text{ m} \pm 0,01\text{ m}$, ANSI C63.10:2009 specifies the method to determine the impact of the non-conductive set-up table on test results. If the manner of cable installation is not known, or if it changes with each installation, cables or wires for floor-standing equipment shall be manipulated to the extent possible to produce the maximum level of emissions. For each mode of operation required to be tested, the frequency spectrum shall be monitored. Variations in antenna height between 1 m and 4 m, antenna polarization, EUT azimuth, and cable or wire placement shall be explored to produce the emission that has the highest amplitude relative to the limit.

Procedure of Final Test

EUT and support equipment were set up on the turntable as per the configuration with highest emission level in the preliminary test. The Analyzer / Receiver scanned from 30MHz to 1000MHz. Emissions were scanned and measured rotating the EUT to 360 degrees, varying cable placement and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level. Record at least six highest emissions. Emission frequency, amplitude, antenna position, polarization and turntable position were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit and only QP reading is presented. The test data of the worst-case condition(s) was recorded.

Procedure of Final Test

EUT and support equipment were set up on the test bench as per the configuration with highest emission level in the preliminary test. A scan was taken on both power lines, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. The test data of the worst-case condition(s) was recorded.

Below 1GHz Set the spectrum analyzer: RBW =100KHz VBW \geq RBW , Span = enough to catch the trace. Sweep = auto; Detector Function = Peak. Trace = Max,hold.

Above 1GHz Set the spectrum analyzer: RBW =1MHz VBW \geq RBW , Span = enough to catch the trace. Sweep = auto; Detector Function = Peak. Trace = Max,hold.

Pre-test for normal mode and EDR mode, to find the normal mode is the worst case.

The worst case emissions were reported.

4.4.3 TEST SETUP

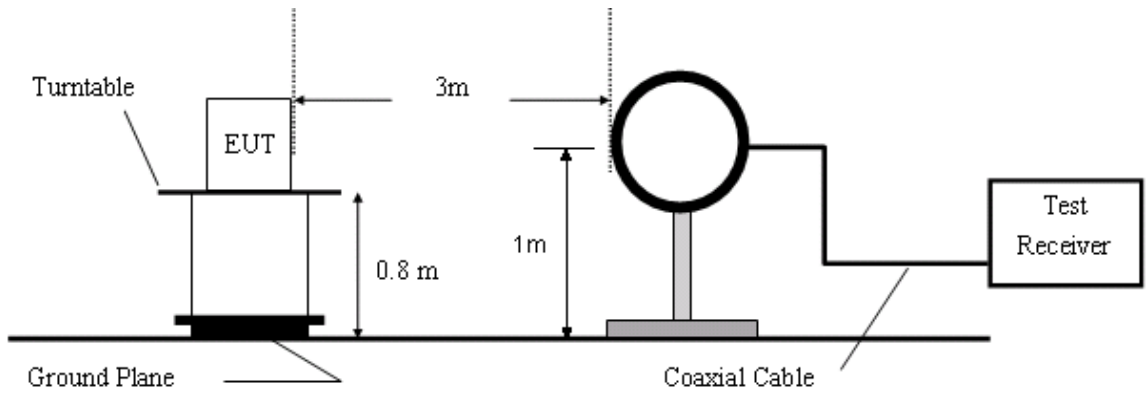


Figure 1. 9KHz to 30MHz radiated emissions test configuration

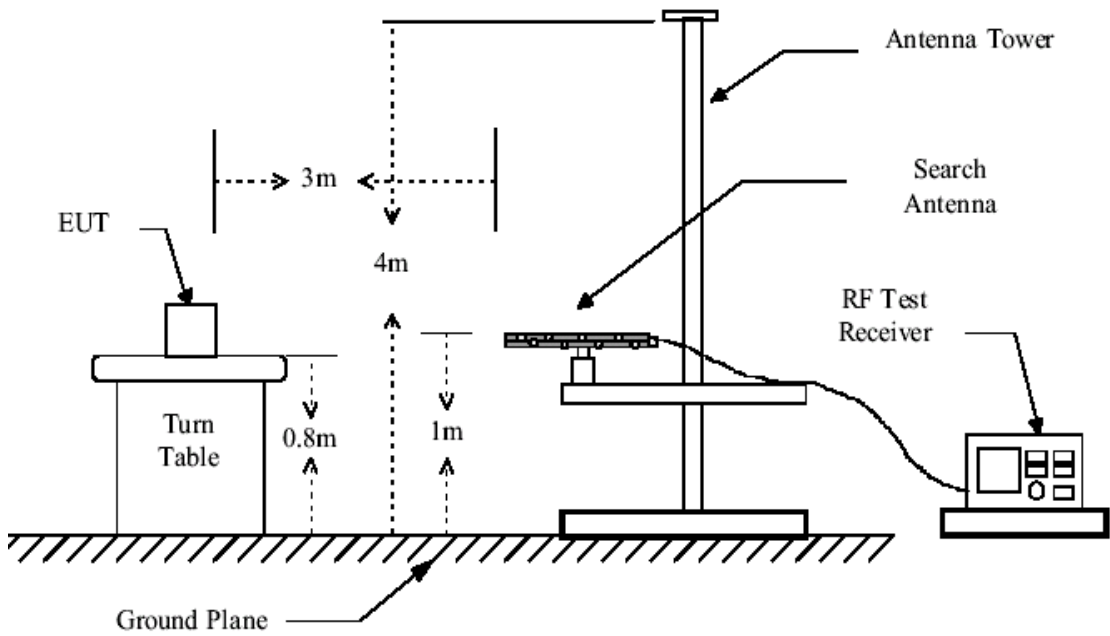


Figure 2. 30MHz to 1GHz radiated emissions test configuration

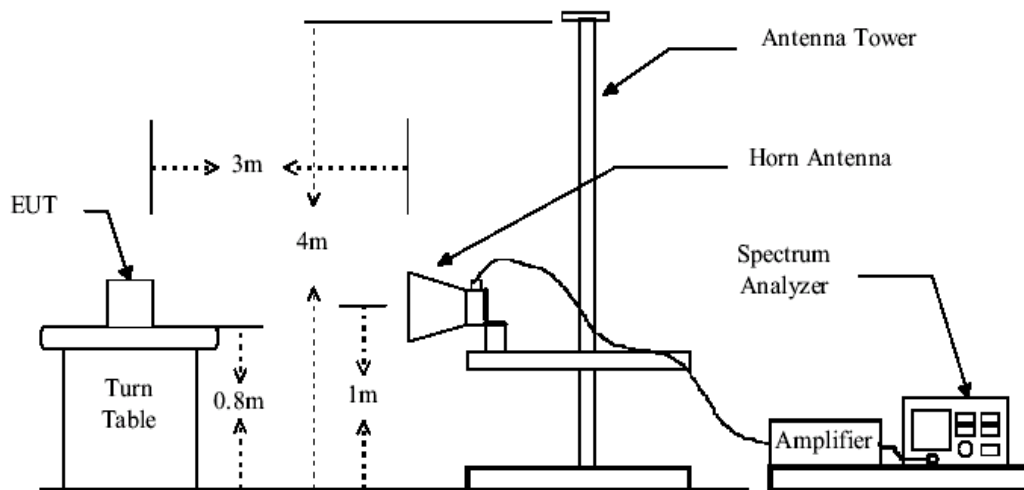


Figure 3. Above 1GHz radiated emissions test configuration

4.4.4 TEST RESULTS

1. Low Frequency 2402MHz

9 kHz~30MHz Spurious Emissions .Quasi-Peak Measurement

No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	0.0151	27.65	-31.15	-3.5	83.91	-87.41	QP
2	0.0348	22.71	-31.13	-8.42	76.75	-85.17	QP
3	0.1560	45.98	-31.08	14.9	64.08	-49.18	QP
4	0.3730	18.86	-31.06	-12.2	56.15	-68.35	QP
5	0.4512	21.95	-31.05	-9.1	54.54	-63.64	QP
6	0.7529	26.52	-31.02	-4.5	50.06	-54.56	QP

30MHz~1GHz Spurious Emissions .Quasi-Peak Measurement

No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Antenna polarization
1	35.9102	11.49	15.81	27.30	40.00	-12.70	Vertical
2	55.3524	17.58	8.82	26.40	40.00	-13.60	Vertical
3	83.8947	20.32	8.98	29.30	40.00	-10.70	Vertical
4	215.6456	8.05	12.25	20.30	43.50	-23.20	Vertical
5	231.9889	20.61	12.99	33.60	46.00	-12.40	Vertical
6	529.9346	3.01	20.79	23.80	46.00	-22.20	Vertical
7	32.2736	2.66	18.04	20.70	40.00	-19.30	Horizontal
8	160.1008	10.61	10.69	21.30	43.50	-22.20	Horizontal
9	176.1498	12.26	10.84	23.10	43.50	-20.40	Horizontal
10	191.6416	20.85	11.45	32.30	43.50	-11.20	Horizontal
11	336.1560	11.34	16.86	28.20	46.00	-17.80	Horizontal
12	924.3423	1.52	26.08	27.60	46.00	-18.40	Horizontal

1~25 GHz Harmonics & Spurious Emissions. Peak & Average Measurement

Peak Measurement:

No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Antenna polarization
1	1835.663	33.69	13.46	47.15	74.00	-26.85	Vertical
2	2283.524	30.20	15.70	45.90	74.00	-28.10	Vertical
3	3000.000	27.80	23.81	51.61	74.00	-22.39	Vertical
4	9877.379	14.60	25.50	40.10	74.00	-33.90	Vertical
5	13391.452	14.83	28.77	43.60	74.00	-30.40	Vertical
6	17896.926	20.07	36.03	56.10	74.00	-17.90	Vertical
7	1835.663	33.73	13.46	47.19	74.00	-26.81	Horizontal
8	2143.282	30.09	14.89	44.98	74.00	-29.02	Horizontal
9	2947.644	28.76	23.09	51.85	74.00	-22.15	Horizontal
10	14935.339	14.77	31.23	46.00	74.00	-28.00	Horizontal
11	16000.884	13.40	33.30	46.70	74.00	-27.30	Horizontal
12	16995.414	14.57	35.73	50.30	74.00	-23.70	Horizontal

AV Measurement:

No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Antenna polarization
1	1835.663	15.84	13.46	29.30	54.00	-24.70	Vertical
2	2283.524	12.80	15.70	28.50	54.00	-25.50	Vertical
3	3000.000	12.49	23.81	36.30	54.00	-17.70	Vertical
4	9877.379	6.20	25.50	31.70	54.00	-22.30	Vertical
5	13391.452	7.23	28.77	36.00	54.00	-18.00	Vertical
6	17896.926	7.27	36.03	43.30	54.00	-10.70	Vertical
7	1835.663	14.54	13.46	28.00	54.00	-26.00	Horizontal
8	2143.282	11.81	14.89	26.70	54.00	-27.30	Horizontal
9	2947.644	11.01	23.09	34.10	54.00	-19.90	Horizontal
10	14935.339	4.17	31.23	35.40	54.00	-18.60	Horizontal
11	16000.884	3.50	33.30	36.80	54.00	-17.20	Horizontal
12	16995.414	4.37	35.73	40.10	54.00	-13.90	Horizontal

The field strength is calculated by adding the Antenna Factor. Correct Factor.

The basic equation with a sample calculation is as follows:

Final Test Level =Receiver Reading + Correct Factor

2.Middle Frequency 2441MHz

9 kHz~30MHz Spurious Emissions .Quasi-Peak Measurement

No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	0.0145	26.78	-31.15	-4.37	83.91	-88.28	QP
2	0.0439	22.83	-31.13	-8.30	76.75	-85.05	QP
3	0.171	32.42	-31.08	1.34	64.08	-62.74	QP
4	0.381	20.36	-31.06	-10.70	56.15	-66.85	QP
5	0.466	21.87	-31.05	-9.18	54.54	-63.72	QP
6	0.8242	29.41	-31.01	-1.60	50.06	-51.66	QP

30MHz~1GHz Spurious Emissions .Quasi-Peak Measurement

No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Antenna polarization
1	31.2036	12.82	18.68	31.50	40.00	-8.50	Vertical
2	58.2239	18.18	8.32	26.50	40.00	-13.50	Vertical
3	83.8947	20.02	8.98	29.00	40.00	-11.00	Vertical
4	132.2562	19.81	8.79	28.60	43.50	-14.90	Vertical
5	208.4958	11.74	11.86	23.60	43.50	-19.90	Vertical
6	994.3963	2.71	26.99	29.70	54.00	-24.30	Vertical
7	39.2885	5.35	13.75	19.10	40.00	-20.90	Horizontal
8	143.8877	8.75	9.55	18.30	43.50	-25.20	Horizontal
9	191.6416	14.25	11.45	25.70	43.50	-17.80	Horizontal
10	238.5996	10.36	13.24	23.60	46.00	-22.40	Horizontal
11	386.8599	3.77	17.93	21.70	46.00	-24.30	Horizontal
12	893.6959	1.08	26.02	27.10	46.00	-18.90	Horizontal

1~25 GHz Harmonics & Spurious Emissions. Peak & Average Measurement

Peak Measurement:

No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Antenna polarization
1	1835.663	35.46	13.46	48.92	74.00	-25.08	Vertical
2	2467.452	39.88	16.78	56.66	74.00	-17.34	Vertical
3	2968.476	28.28	23.37	51.65	74.00	-22.35	Vertical
4	4873.832	18.96	16.34	35.30	74.00	-38.70	Vertical
5	9849.058	14.85	25.45	40.30	74.00	-33.70	Vertical
6	17490.496	17.19	35.51	52.70	74.00	-21.30	Vertical
7	1835.663	36.00	13.46	49.46	74.00	-24.54	Horizontal
8	2467.452	53.56	16.78	70.34	74.00	-3.66	Horizontal
9	2886.022	29.49	22.22	51.71	74.00	-22.29	Horizontal
10	14061.359	14.38	30.22	44.60	74.00	-29.40	Horizontal
11	16325.754	13.22	33.58	46.80	74.00	-27.20	Horizontal
12	17440.346	11.97	35.53	47.50	74.00	-26.50	Horizontal

AV Measurement:

No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Antenna polarization
1	1835.663	13.44	13.46	26.90	54.00	-27.10	Vertical
2	2467.452	13.62	16.78	30.40	54.00	-23.60	Vertical
3	2968.476	11.73	23.37	35.10	54.00	-18.90	Vertical
4	4873.832	10.56	16.34	26.90	54.00	-27.10	Vertical
5	9849.058	4.25	25.45	29.70	54.00	-24.30	Vertical
6	17490.496	7.59	35.51	43.10	54.00	-10.90	Vertical
7	1835.663	15.24	13.46	28.70	54.00	-25.30	Horizontal
8	2467.452	19.52	16.78	36.30	54.00	-17.70	Horizontal
9	2886.022	8.88	22.22	31.10	54.00	-22.90	Horizontal
10	14061.359	4.28	30.22	34.50	54.00	-19.50	Horizontal
11	16325.754	3.42	33.58	37.00	54.00	-17.00	Horizontal
12	17440.346	1.37	35.53	36.90	54.00	-17.10	Horizontal

3.High Frequency 2480MHz

9 kHz~30MHz Spurious Emissions .Quasi-Peak Measurement

No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	0.0151	28.56	-31.15	-2.59	83.91	-86.5	QP
2	0.0348	21.92	-31.13	-9.21	76.75	-85.96	QP
3	0.1562	29.78	-31.08	-1.3	64.08	-65.38	QP
4	0.3731	19.66	-31.06	-11.4	56.15	-67.55	QP
5	0.4521	21.85	-31.05	-9.2	54.54	-63.74	QP
6	0.7516	26.12	-31.02	-4.9	50.06	-54.96	QP

30MHz~1GHz Spurious Emissions .Quasi-Peak Measurement

No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Antenna polarization
1	35.9102	10.09	15.81	25.90	40.00	-14.10	Vertical
2	59.8831	18.36	8.04	26.40	40.00	-13.60	Vertical
3	142.2796	18.80	9.40	28.20	43.50	-15.30	Vertical
4	176.1498	15.86	10.84	26.70	43.50	-16.80	Vertical
5	224.2973	13.29	12.71	26.00	46.00	-20.00	Vertical
6	893.6959	1.08	26.02	27.10	46.00	-18.90	Vertical
7	31.9129	2.95	18.25	21.20	40.00	-18.80	Horizontal
8	138.3376	10.40	9.10	19.50	43.50	-24.00	Horizontal
9	191.6416	14.75	11.45	26.20	43.50	-17.30	Horizontal
10	287.2147	18.73	14.67	33.40	46.00	-12.60	Horizontal
11	330.5365	12.61	16.69	29.30	46.00	-16.70	Horizontal
12	908.8900	1.27	26.13	27.40	46.00	-18.60	Horizontal

1~25 GHz Harmonics & Spurious Emissions. Peak & Average Measurement

Peak Measurement:

No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Antenna polarization
1	1835.663	36.32	13.46	49.78	74.00	-24.22	Vertical
2	2675.600	29.87	19.19	49.06	74.00	-24.94	Vertical
3	2984.196	29.14	23.58	52.72	74.00	-21.28	Vertical
4	13468.578	15.02	28.88	43.90	74.00	-30.10	Vertical
5	14764.778	13.65	31.15	44.80	74.00	-29.20	Vertical
6	16946.684	14.56	35.54	50.10	74.00	-23.90	Vertical
7	1608.595	31.03	12.24	43.27	74.00	-30.73	Horizontal
8	1835.663	33.62	13.46	47.08	74.00	-26.92	Horizontal
9	2973.707	27.90	23.44	51.34	74.00	-22.66	Horizontal
10	14061.359	14.48	30.22	44.70	74.00	-29.30	Horizontal
11	16325.754	13.22	33.58	46.80	74.00	-27.20	Horizontal
12	17093.297	12.19	35.71	47.90	74.00	-26.10	Horizontal

AV Measurement:

No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Antenna polarization
1	1835.663	14.84	13.46	28.30	54.00	-25.70	Vertical
2	2675.600	12.51	19.19	31.70	54.00	-22.30	Vertical
3	2984.196	10.52	23.58	34.10	54.00	-19.90	Vertical
4	13468.578	6.42	28.88	35.30	54.00	-18.70	Vertical
5	14764.778	2.75	31.15	33.90	54.00	-20.10	Vertical
6	16946.684	1.56	35.54	37.10	54.00	-16.90	Vertical
7	1608.595	14.66	12.24	26.90	54.00	-27.10	Horizontal
8	1835.663	14.64	13.46	28.10	54.00	-25.90	Horizontal
9	2973.707	10.96	23.44	34.40	54.00	-19.60	Horizontal
10	14061.359	4.58	30.22	34.80	54.00	-19.20	Horizontal
11	16325.754	2.42	33.58	36.00	54.00	-18.00	Horizontal
12	17093.297	1.39	35.71	37.10	54.00	-16.90	Horizontal

Remark:

1). No any other emissions level which are attenuated less than 20dB below the limit.

According to 15.31(o), The amplitude of spurious emissions from intentional radiators and emissions from unintentional radiators which are attenuated more than 20 dB below the permissible value need not be reported unless specifically required elsewhere in this Part.

Hence there no other emissions have been reported.

2). As shown in Section, for frequencies above 1000 MHz. the above field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

3). The test only perform the EUT in transmitting status since the test frequencies were over 1GHz only required transmitting status.

Test result: The unit does meet the requirements.

4.5 BAND EDGES REQUIREMENT

4.5.1 LIMITS

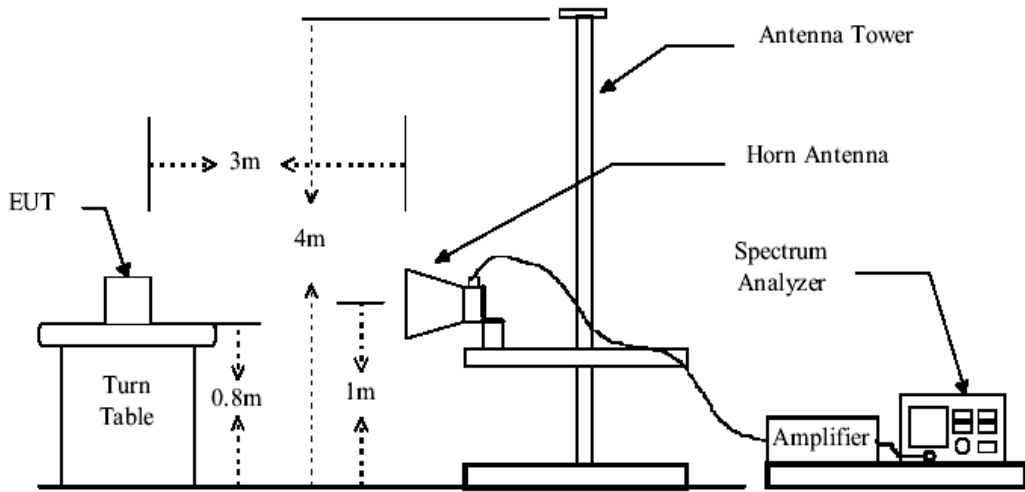
Section 15.247 (d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required.

4.5.2 TEST PROCEDURES

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set the spectrum analyzer: RBW =1MHz VBW \geq RBW, Span = enough to catch the trace. Sweep = auto; Detector Function = Peak. Trace = Max,hold.
4. Set the spectrum analyzer: RBW =1MHz VBW = 10 KHz, Span = enough to catch the trace. Sweep = auto; Detector Function = AVG. Trace = Max,hold.
5. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.

Repeat above procedures until all measured frequencies were complete.

4.5.3 TEST SETUP



4.5.4 TEST RESULTS

Pre-test the Bluetooth normal mode and EDR mode, record normal mode data.

Channel Low

No.	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	2390.000	23.78	16.32	40.1	74.00	-33.9	peak	VERTICAL
2	2400.000	24.63	16.38	41.01	74.00	-32.99	peak	VERTICAL
3	2390.000	15.21	16.32	31.53	54.00	-22.47	AVG	VERTICAL
4	2400.000	14.19	16.38	30.57	54.00	-23.43	AVG	VERTICAL
1	2390.000	24.61	16.32	40.93	74.00	-33.07	peak	HORIZONTAL
2	2400.000	25.92	16.38	42.3	74.00	-31.7	peak	HORIZONTAL
3	2390.000	14.35	16.32	30.67	54.00	-23.33	AVG	HORIZONTAL
4	2400.000	15.63	16.38	32.01	54.00	-21.99	AVG	HORIZONTAL

Channel High

No.	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	2483.500	24.79	16.87	41.66	74.00	-32.34	peak	VERTICAL
2	2500.000	25.81	16.97	42.78	74.00	-31.22	peak	VERTICAL
3	2483.500	15.72	16.87	32.59	54.00	-21.41	AVG	VERTICAL
4	2500.000	14.52	16.97	31.49	54.00	-22.51	AVG	VERTICAL
1	2483.500	24.72	16.87	41.59	74.00	-32.41	peak	HORIZONTAL
2	2500.000	26.21	16.97	43.18	74.00	-30.82	peak	HORIZONTAL
3	2483.500	15.31	16.87	32.18	54.00	-21.82	AVG	HORIZONTAL
4	2500.000	14.52	16.97	31.49	54.00	-22.51	AVG	HORIZONTAL

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