

FCC CERTIFICATION TEST REPORT

For
FCC ID: X8F-GT2

Report Reference No. : 15FAB07020 21

Date of issue : 2015-07-29

Testing Laboratory : ATT Product Service Co., Ltd.

Address : No. 3, ChangLianShan Industrial Park, ChangAn Town,
DongGuan City, GuangDong, China.

Applicant's name : SkyHawke Technologies, LLC

Address : 274 Commerce Park Drive N/A Ridgeland Mississippi
United States 39157 Richard Root

Manufacturer : Season Group USA, LLC

Test specification:

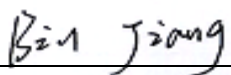
Test item description : Game Tracker

Trade Mark : --

Model/Type reference : GT2

Ratings : Rechargeable battery 3.7Vd.c 770mAh; with micro USB port
(DC 5V, 500mA)

Responsible Engineer


(Bin Jiang /Engineer)

Approved by

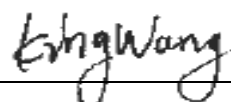

(King Wang/EMC Manger)

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TEST REPORT DECLARE

Applicant	:	SkyHawke Technologies, LLC
Address	:	274 Commerce Park Drive N/A Ridgeland Mississippi United States 39157 Richard Root
Equipment under Test	:	Game Tracker
Model No	:	GT2
FCC ID	:	X8F-GT2
Manufacturer	:	Season Group USA, LLC
Address	:	Season Group USA, LCC 3503 Crosspoint, Suite #2 San Antonio, Texas 78217

Test Standard Used: FCC Rules and Regulations Part 15 Subpart C: 2013

Test procedure used: ANSI C63.10: 2013, ANSI C63.4:2014, KDB558074 D01 DTS Meas
Guidance V03r03.

We Declare:

The equipment described above is tested by ATT Product Service Co., Ltd. and in the configuration tested the equipment complied with the standards specified above. The test results are contained in this test report and ATT Product Service Co., Ltd. is assumed of full responsibility for the accuracy and completeness of these tests.

After test and evaluation, our opinion is that the equipment provided for test compliance with the requirement of the above FCC standards.

Report No:	15FAB07020 21		
Date of Test:	2015-07-16 To 2015-07-25	Date of Report:	2015-07-29

Note: This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of ATT Product Service Co., Ltd.

1. Summary of test results

The EUT have been tested according to the applicable standards as referenced below.		
Description of Test Item	Standard	Results
6dB Bandwidth and 99% Bandwidth	FCC Part 15: 15.247 KDB558074	PASS
Peak Output Power	FCC Part 15: 15.247 KDB558074	PASS
Power Spectral Density	FCC Part 15: 15.247 KDB558074	PASS
Band Edge	FCC Part 15: 15.247	PASS
Spurious Emission	FCC Part 15.205/15.209	PASS
Power Line Conducted Emission	FCC Part 15: 15.207 ANSI C63.4:2009	PASS
Antenna requirement	FCC Part 15: 15.203	PASS

Note:1:For radiated emission test, the EUT was placed on three different polar directions: X axis, Y axis and Z axis, by rescan, only the worst setup is reported.

2. 85% to 115% input power voltage have been adjusted to find the worse case and only worse case is reported.

2. General test information

2.1. Description of EUT

EUT* Name	:	Game Tracker
Model Number	:	GT2
EUT function description	:	Please reference user manual of this device
Power supply	:	Rechargeable battery 3.7Vd.c 770mAh; with micro USB port
Radio Technology	:	Bluetooth 4.0
Operation frequency	:	2402-2480MHz
Modulation	:	GFSK
Antenna Type	:	built-in antenna, maximum PK gain:0dBi
Date of Receipt	:	2015-07-16
Sample Type	:	Series production

Note1: EUT is the ab.of equipment under test.

Channle information							
CH	Frequency	CH	Frequency	CH	Frequency	CH	Frequency
0	2402	10	2422	20	2442	30	2462
1	2404	11	2424	21	2444	31	2464
2	2406	12	2426	22	2446	32	2466
3	2408	13	2428	23	2448	33	2468
4	2410	14	2430	24	2450	34	2470
5	2412	15	2432	25	2452	35	2472
6	2414	16	2434	26	2454	36	2474
7	2416	17	2436	27	2456	37	2476
8	2418	18	2438	28	2458	38	2478
9	2420	19	2440	29	2460	39	2480

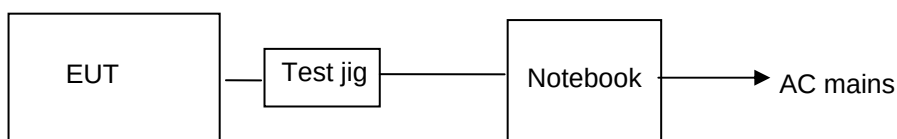
2.2. Accessories of EUT

Description of Accessories	Manufacturer	Model number or Type	Output.
/	/	/	/

2.3. Assistant equipment used for test

Description of Assistant equipment	Manufacturer	Model number or Type	EMC Compliance	SN
Notebook	lenovo	7457	FCC DOC	7457A82
Mobile phone	LG	LG-D821	FCCID:ZNFD821	
Notebook Computer	lenovo	7457	FCC DOC approved	7457A82
Mouse	DELL	MSU1175	FCC DOC approved	13A00303345DN
Headphone	Senicc	ST-2688	FCC VOC approved	150 cm non-shielding
Printer	Epson	P952B	FCC DOC approved	AXQ0018586

2.4. Block diagram of EUT configuration for test



EUT was connected to control to a special test jig provided by manufacturer which has a Micro USB connector to connect to Notebook, and the Notebook will run a special test software to control EUT work in Continuous TX mode (>98% duty cycle), and select test channel, wireless mode and data rate.

Tested mode, channel, and data rate information			
Mode	data rate (Mbps) (see Note)	Channel	Frequency (MHz)
GFSK	2	Low :CH0	2402
	2	Middle: CH19	2440
	2	High: CH39	2480
Note: According exploratory test, EUT will have maximum output power in those data rate, so those data rate were used for all test.			

2.5. Test environment conditions

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

Temperature range:	21-25°C
Humidity range:	40-75%
Pressure range:	86-106kPa

2.6. Measurement uncertainty

Test Item	Uncertainty
Uncertainty for Conduction emission test	2.44dB
Uncertainty for Radiation Emission test (9KHz-30MHz)	3.21dB
Uncertainty for Radiation Emission test (30MHz-200MHz)	3.42 dB (Polarize: V)
	3.52 dB (Polarize: H)
Uncertainty for Radiation Emission test (200MHz-1GHz)	3.52 dB (Polarize: V)
	3.54 dB (Polarize: H)
Uncertainty for Radiation Emission test (1GHz to 25GHz)	4.20 dB (Polarize: V)
	4.20 dB (Polarize: H)
Uncertainty for radio frequency	1×10-9
Uncertainty for conducted RF Power	0.65dB

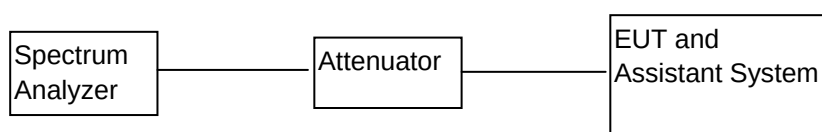
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

3. 6dB Bandwidth and 99% Bandwidth

3.1. Test equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Due.	Cal. Interval
1	Spectrum analyzer	R&S	FSU	1166.1660.26	2015/12/26	1 Year
2	Attenuator	Mini-Circuits	BW-S10W2	101109	2015/12/26	1 Year
3	RF Cable	Micable	C10-01-01-1	100309	2015/12/26	1 Year

3.2. Block diagram of test setup



3.3. Limits

For direct sequence systems, the minimum 6dB bandwidth shall be at least 500 KHz

3.4. Test Procedure

- (1) Configure EUT and assistant system according clause 2.4 and 3.2
- (2) Connect EUT's antenna output to spectrum analyzer by RF cable.
- (3) Configure EUT work in test mode as stated in clause 2.4.
- (4) Set the spectrum analyzer as follows:

RBW:	100KHz
VBW:	300KHz
Detector Mode:	Peak
Sweep time:	auto
Trace mode:	Max hold

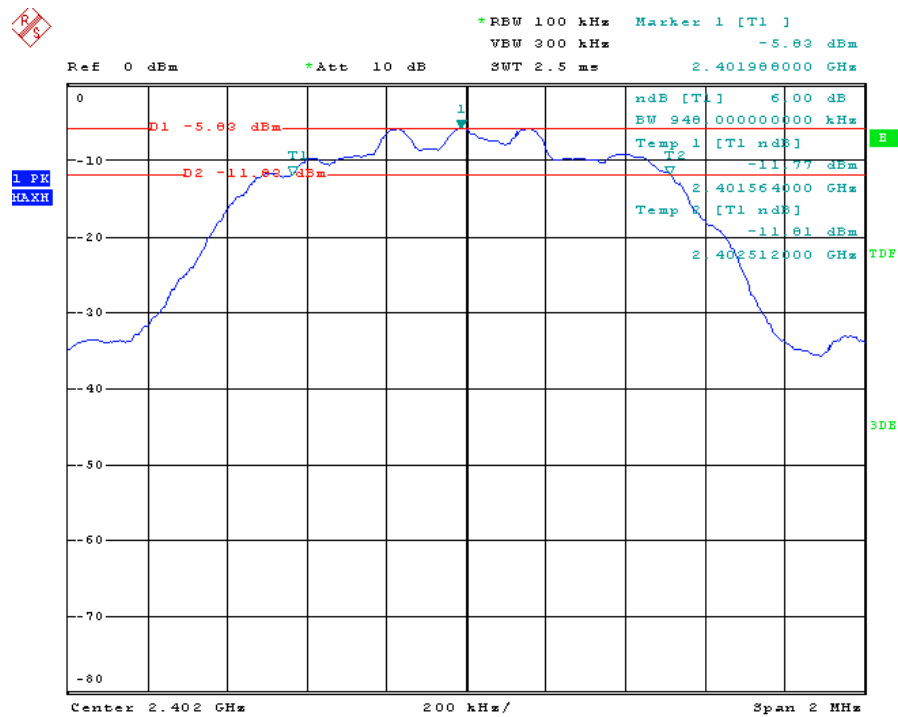
- (5) Allow the trace to stabilize, measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

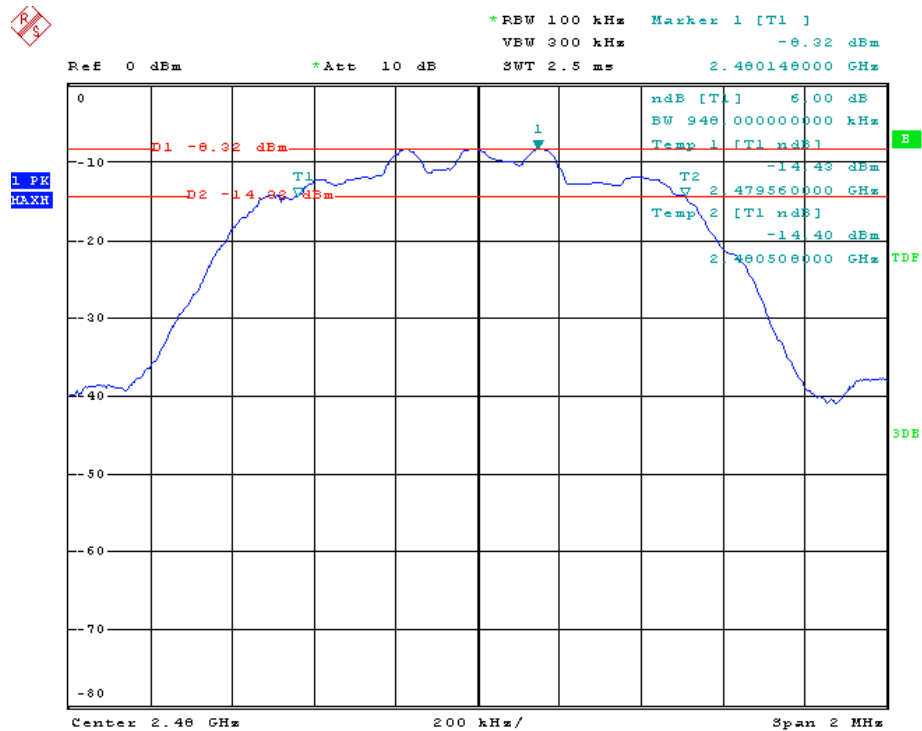
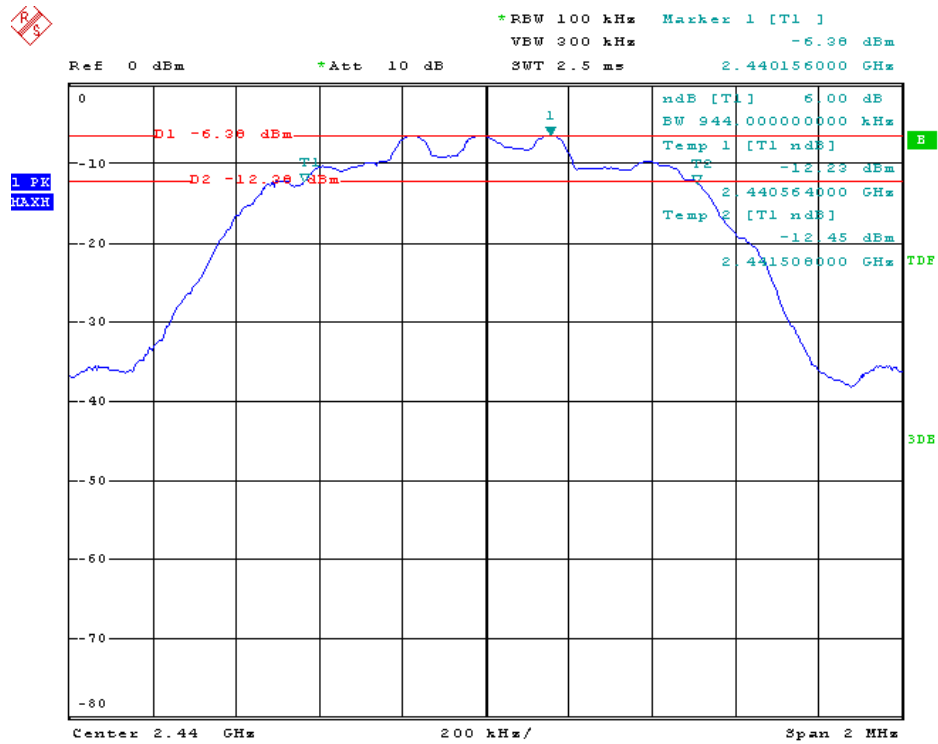
3.5. Test Result

EUT: Game Tracker M/N: GT2			
EUT Set Mode	CH or Frequency	6 dB bandwidth	99% dB bandwidth
		Result (MHz)	Result (MHz)
GFSK	CH0	0.948	1.26
	CH19	0.944	1.248
	CH39	0.948	1.244
Limit: >500KHz			Conclusion: PASS

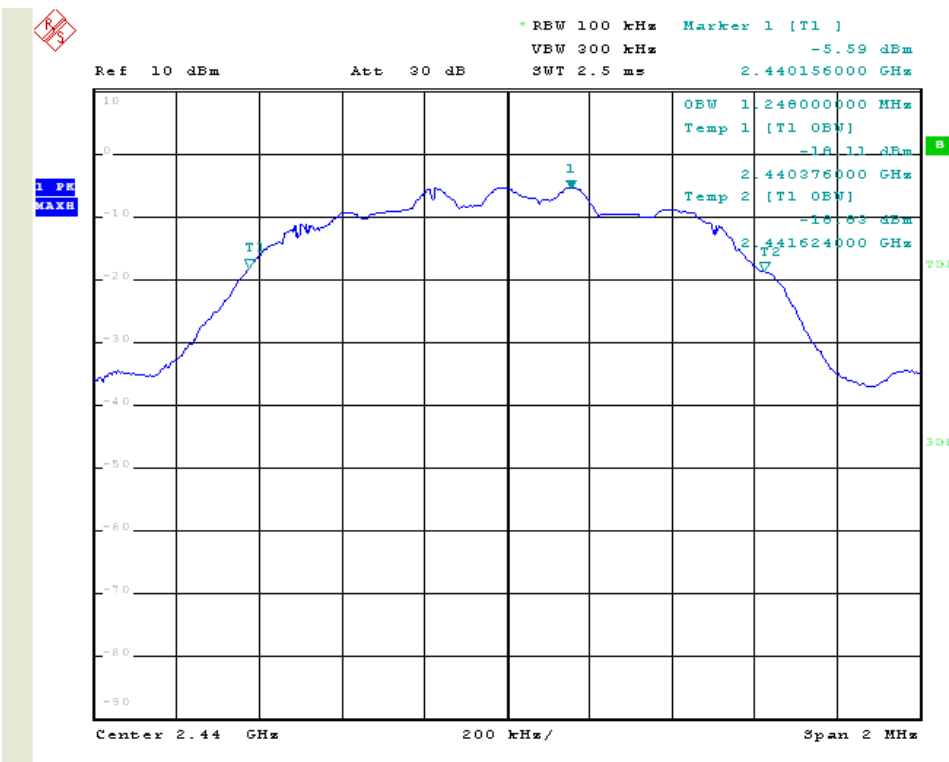
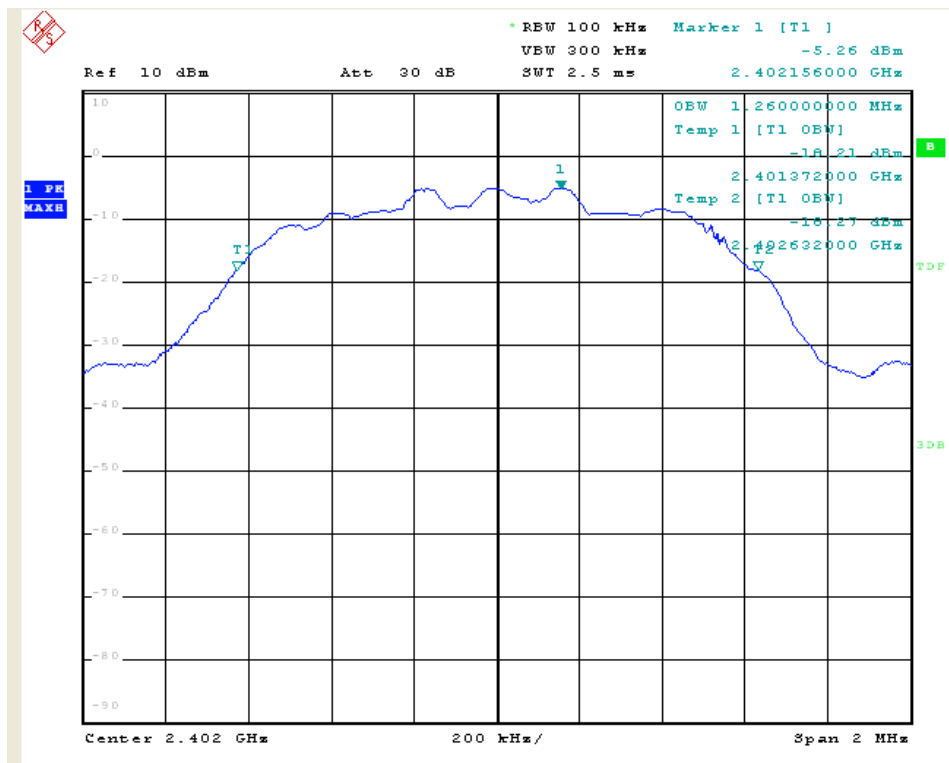
3.6. Original test data

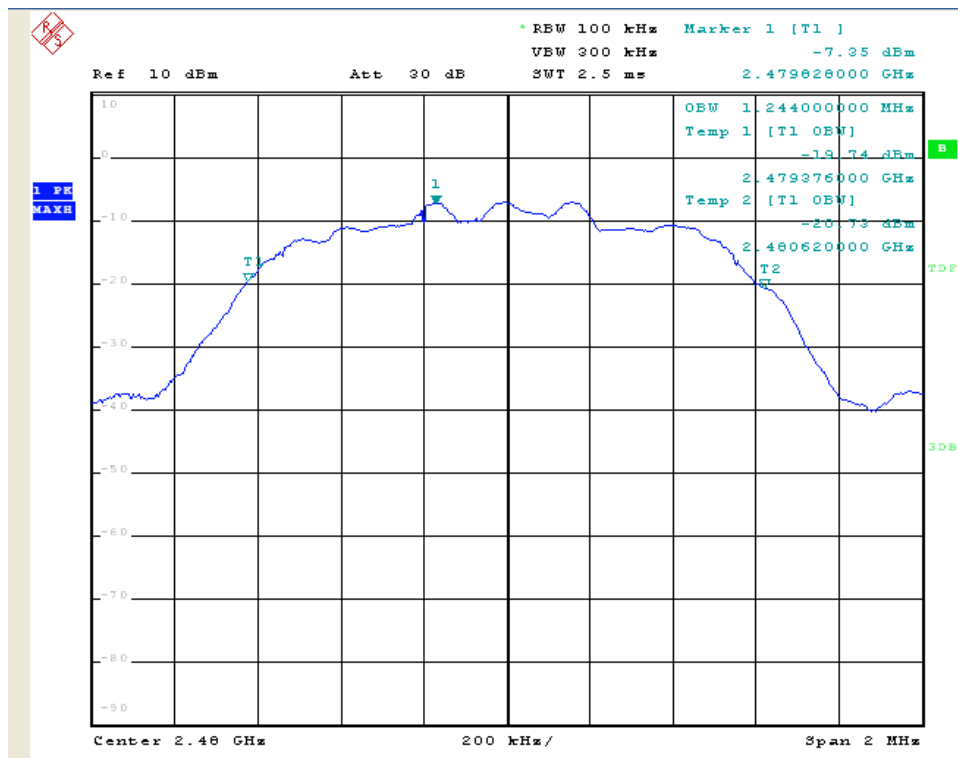
6 dB bandwidth





99% Bandwidth





4. Maximum Output Power

4.1. Test equipment

Same with 3.1

4.2. Block diagram of test setup

Same with 3.2

4.3. Limits

For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz bands: 1 Watt. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

4.4. Test Procedure

- (1) Configure EUT and assistant system according clause 2.4 and 3.2
- (2) Connect EUT's antenna output to spectrum analyzer by RF cable.
- (3) Configure EUT work in test mode as stated in clause 2.4.
- (4) Set the spectrum analyzer as follows:

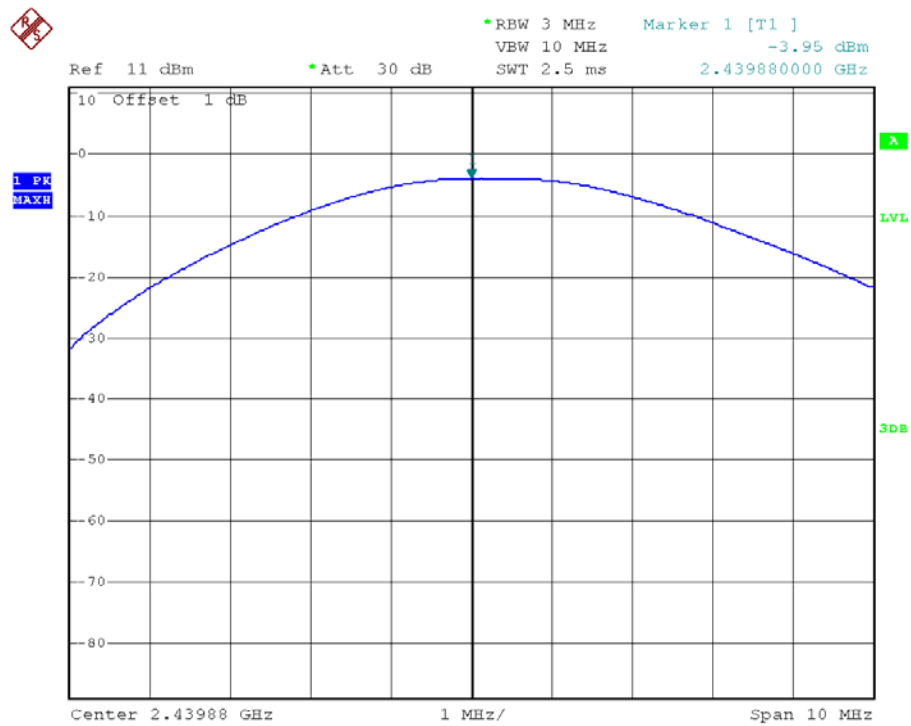
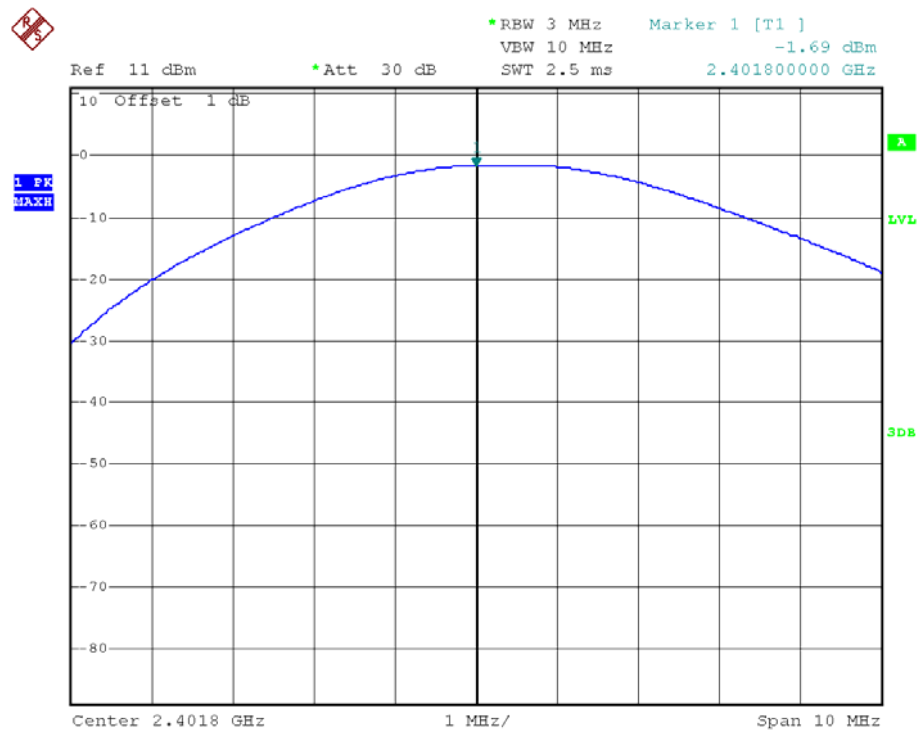
RBW:	3MHz
VBW:	10MHz
Span	>1.5x 6dB bandwidth
Detector Mode:	PEAK
Sweep time:	auto
Trace mode	Max hold

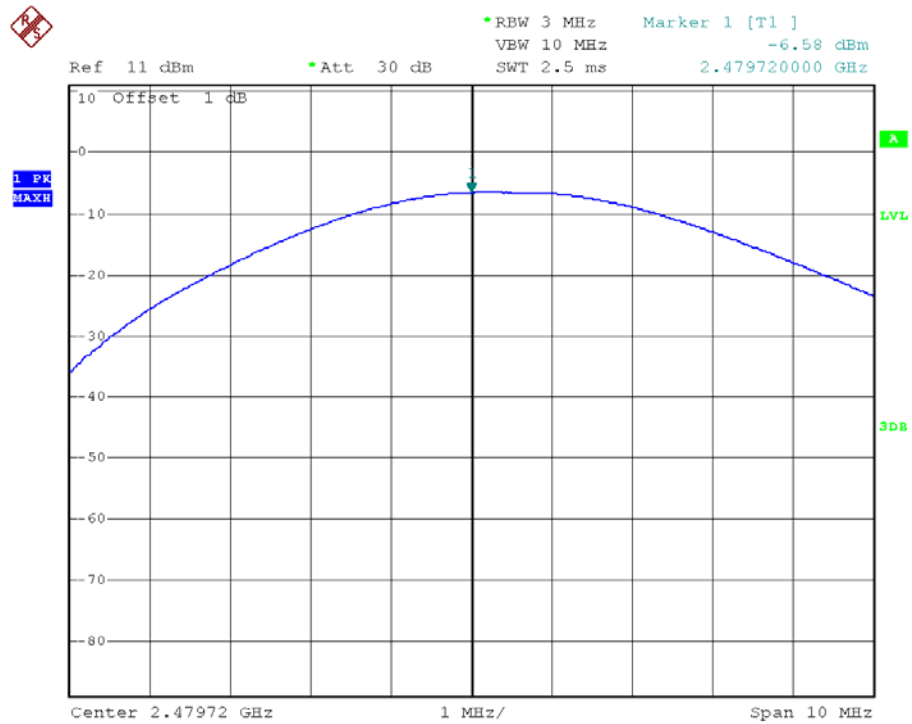
- (5) Allow the trace to stabilize, Use the instrument's band/channel power measurement function with the band limits set equal to the DTS bandwidth edges measure out the Average and PK output power.

4.5. Test Result

EUT: Game Tracker M/N: GT2			
EUT Set Mode	Data Rate (Mbps)	CH	Result(dBm)
			Peak
GFSK	2	CH0	-1.69
		CH19	-3.95
		CH39	-6.58
Limit: 30dBm		Conclusion: PASS	

4.6. Original test data





5. Power Spectral Density

5.1 Test equipment

Same with 3.1

5.2 Block diagram of test setup

Same with 3.2

5.3 Limits

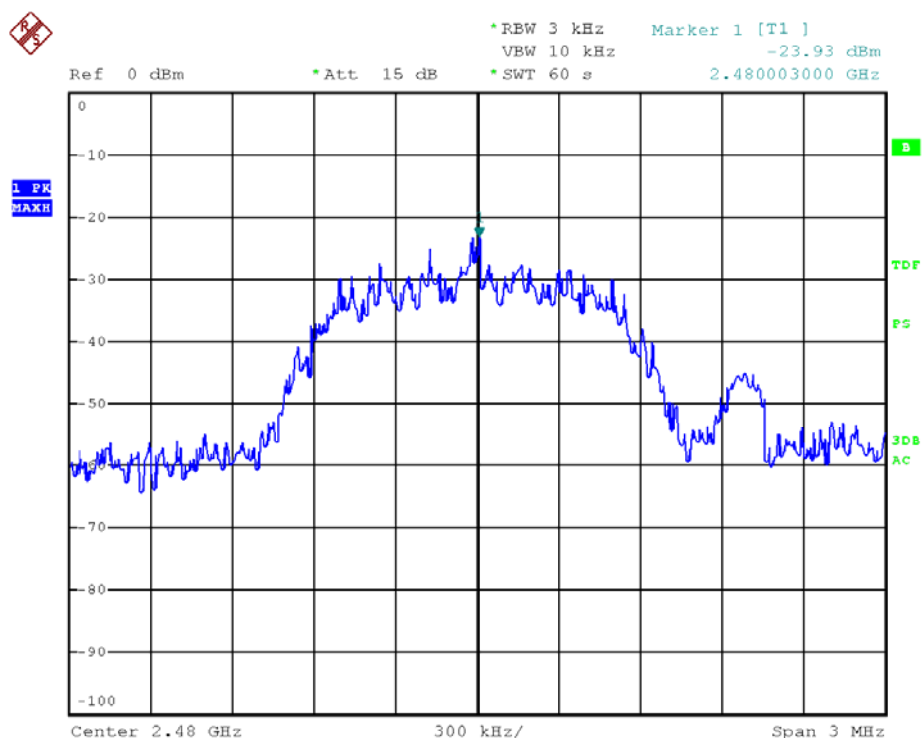
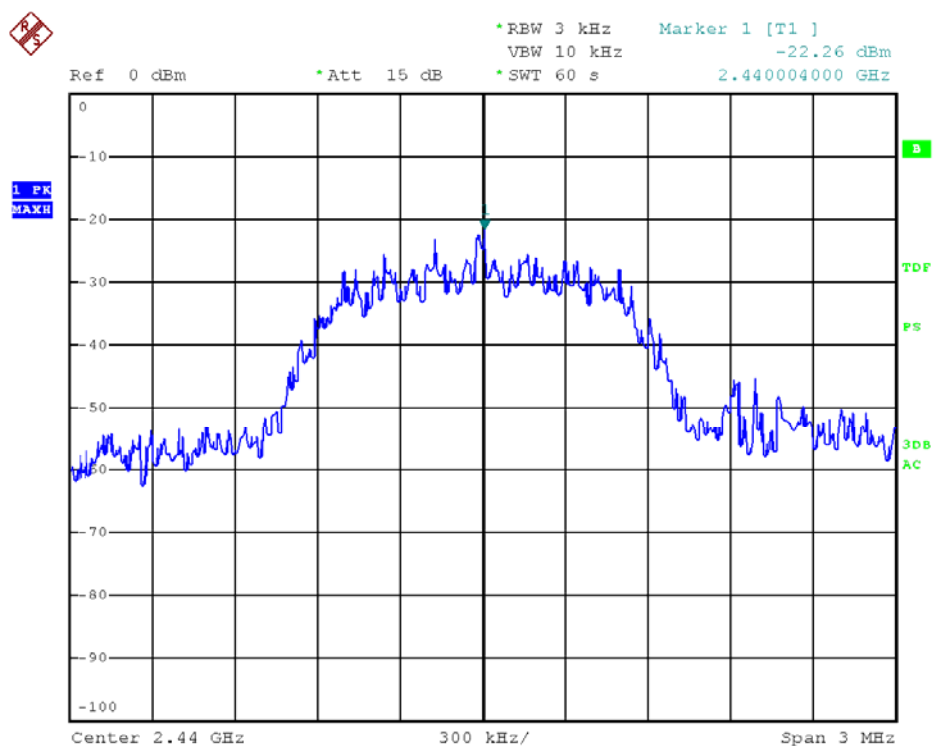
For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3 kHz band during any time interval of continuous transmission.

5.4 Test Procedure

- (1) Configure EUT and assistant system according clause 2.4 and 5.2
- (2) Connect EUT's antenna output to spectrum analyzer by RF cable.
- (3) Configure EUT work in test mode as stated in clause 2.4.
- (4) Set the spectrum analyzer as follows:

Center frequency	Channel center frequency
RBW:	3 kHz
VBW:	10kHz
Span	1.5times the DTS bandwidth
Detector Mode:	PEAK
Sweep time:	auto
Trace mode	Max hold

- (5) Allow the trace to stabilize, use the peak marker function to determine the maximum amplitude level within the RBW.
- (6) If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.



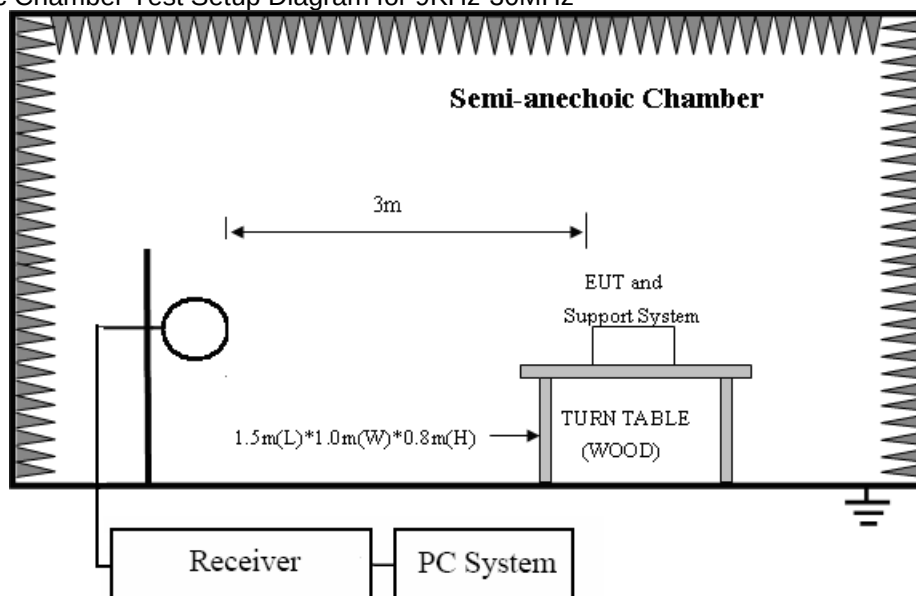
6 Spurious Emission

6.1 Test equipment

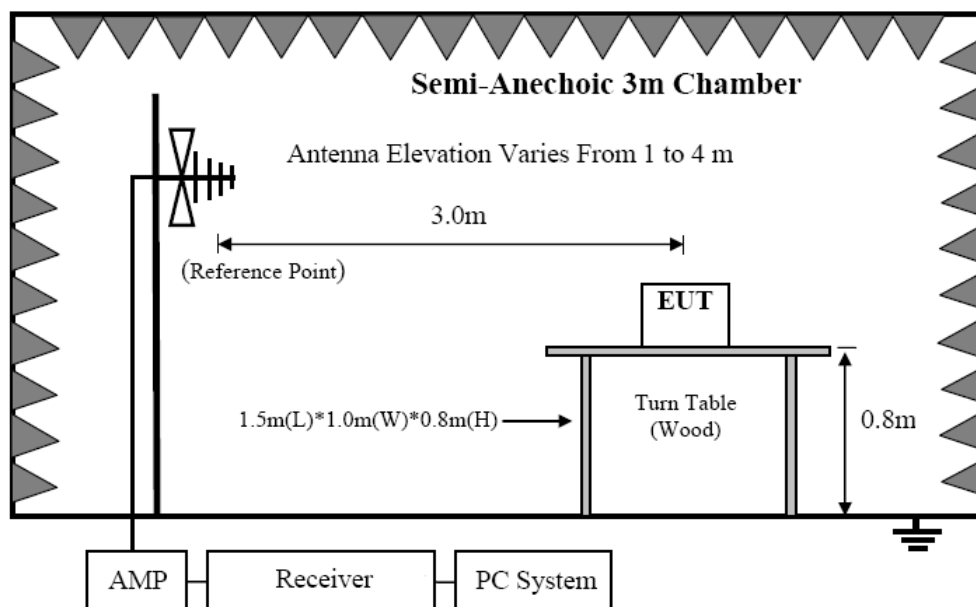
Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Due.	Cal. Interval
1	EMI Test Receiver	R&S	ESU8	100316	2015/12/26	1 Year
2	Spectrum analyzer	R&S	FSU	1166.1660.26	2016/07/11	1 Year
3	Loop antenna	TESEQ	HLA6120	20129	2015/12/26	1 Year
4	Trilog Broadband Antenna	Schwarzbeck	VULB9163	9163-462	2015/12/26	1 Year
5	Double Ridged Horn Antenna	R&S	HF907	100276	2015/12/26	1 Year
6	Horn Antenna	EMCO	3116	00060095	2015/12/26	1 Year
7	Pre-amplifier	A.H.	PAM-1840VH	562	2015/12/26	1 Year
8	Pre-amplifier	R&S	AFS33-18002 650-30-8P-44	SEL0080	2015/12/26	1 Year
9	RF Cable	R&S	R01	10403	2015/12/26	1 Year
10	RF Cable	R&S	R02	10512	2015/12/26	1 Year

6.2 Block diagram of test setup

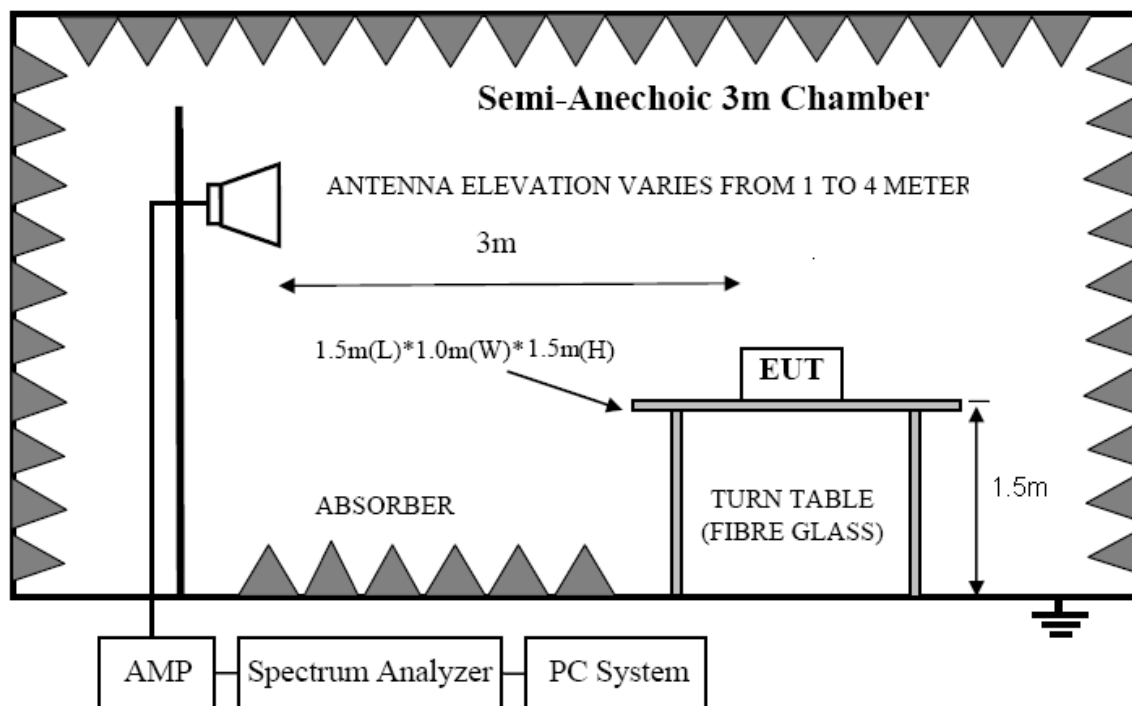
In 3m Anechoic Chamber Test Setup Diagram for 9KHz-30MHz



In 3m Anechoic Chamber Test Setup Diagram for 30MHz-1GHz



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



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

6.3 Limit

8.3.1 FCC 15.205 Restricted frequency band

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

8.3.2 FCC 15.209 Limit.

FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMIT	
		μV/m	dB(μV)/m
0.009 ~ 0.490	300	2400/F(KHz)	67.6-20log(F)
0.490 ~ 1.705	30	24000/F(KHz)	87.6-20log(F)
1.705 ~ 30.0	30	30	29.54
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
960 ~ 1000	3	500	54.0
Above 1000	3	74.0 dB(μV)/m (Peak) 54.0 dB(μV)/m (Average)	

Note: (1) The emission limits shown in the above table are based on measurements employing a CISPR QP detector except for the frequency bands 9-90KHz, 110-490KHz and above 1000MHz. Radiated emissions limits in these three bands are based on measurements employing an average detector.

(2) At frequencies below 30MHz, measurement may be performed at a distance closer than that specified, and the limit at closer measurement distance can be extrapolated by below formula:

$$\text{Limit}_{3m}(\text{dBuV/m}) = \text{Limit}_{30m}(\text{dBuV/m}) + 40\text{Log}(30m/3m)$$

8.3.3 Limit for this EUT

All the emissions appearing within 15.205 restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions shall be at least 30dB below the fundamental emissions, or comply with 15.209 limits.

6.4 Test Procedure

- (1) EUT was placed on a non-metallic table, 80 cm above the ground plane inside a semi-anechoic chamber.
- (2) Setup EUT and assistant system according clause 2.4 and 7.2
- (3) Test antenna was located 3m from the EUT on an adjustable mast, and the antenna used as below table.

Test frequency range	Test antenna used
9KHz-30MHz	Active Loop antenna
30MHz-1GHz	Trilog Broadband Antenna
1GHz-18GHz	Double Ridged Horn Antenna(1GHz-18GHz)
18GHz-40GHz	Horn Antenna(18GHz-40GHz)

According ANSI C63.10:2013 clause 6.4.4.2 and 6.5.3, for measurements below 30 MHz, the loop antenna was positioned with its plane vertical from the EUT and rotated about its vertical axis for maximum response at each azimuth position around the EUT. And the loop antenna also be positioned with its plane horizontal at the specified distance from the EUT. The center of the loop is 1 m above the ground. for measurement above 30MHz, the Trilog Broadband Antenna or Horn Antenna was located 3m from EUT, Measurements were made with the antenna positioned in both the horizontal and vertical planes of Polarization, and the measurement antenna was varied from 1 m to 4 m. in height above the reference ground plane to obtain the maximum signal strength.

- (4) Below pre-scan procedure was first performed in order to find prominent frequency spectrum radiated emissions from 9KHz to 25GHz:
 - (a) Scanning the peak frequency spectrum with the antenna specified in step (3), and the EUT was rotated 360 degree, the antenna height was varied from 1m to 4m(Except loop antenna, it's fixed 1m above ground.)
 - (b) Change work frequency or channel of device if practicable.
 - (c) Change modulation type of device if practicable.
 - (d) Change power supply range from 85% to 115% of the rated supply voltage
 - (e) Rotated EUT though three orthogonal axes to determine the attitude of EUT arrangement produces highest emissions.

Spectrum frequency from 9KHz to 25GHz (tenth harmonic of fundamental frequency) was investigated, and no any obvious emission were detected from 18GHz to 25GHz, so below final test was performed with frequency range from 9KHz to 18GHz.

- (5) For final emissions measurements at each frequency of interest, the EUT was rotated and the antenna height was varied between 1m and 4m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to ANSI C63.10 2013 on Radiated Emission test.
- (6) The emissions from 9KHz to 1GHz were measured based on CISPR QP detector except for the frequency bands 9-90KHz, 110-490KHz, for emissions from 9KHz-90KHz, 110KHz-490KHz and above 1GHz were measured based on average detector, for emissions above 1GHz, peak emissions also be measured and need comply with Peak limit.
- (7) The emissions from 9KHz to 1GHz, QP or average values were measured with EMI receiver with below RBW

Frequency band	RBW
9KHz-150KHz	200Hz
150KHz-30MHz	9KHz
30MHz-1GHz	120KHz

- (8) For emissions above 1GHz, both Peak and Average level were measured with Spectrum Analyzer, and the RBW is set at 1MHz, VBW is set at 3MHz Peak detector for Peak measure ;RMS detector for AV value.

6.5 Test result

PASS. (See below detailed test result)

All the emissions except fundamental emission from 9KHz to 25GHz were comply with 15.209 limit.

Note1: According exploratory test no any obvious emission were detected from 9KHz to 30MHz and 18GHz to 25GHz, so the final test was performed with frequency range from 30MHz to 18GHz and recorded in below.

Note2: For below test data, when the limit tabular marked "/" means this frequency point is the fundamental emission and no need comply with this limit.

Test Result

Test Site : DDT 3m Chamber

EUT : Game Tracker

Model Number : GT2

Power Supply : DC 3.7V

Test Mode : Keeping Tx

Condition : Temp:24.5'C,Humi:55%,
Press:100.1kPa

Antenna/Distance : VULB 9163、BBHA9120D /3m

Memo :

Frequency	Receiver		Rx Antenna		Cable Loss (dB)	Amplifier Gain (dB)	Result Level (dBµV/m)	FCC 15.247 & 15.209	
(MHz)	Reading (dBµV)	(PK/QP/AV)	Polar (H/V)	Factor (dB)				Limit (dBµV/m)	Margin (dB)
Low Channel (2402)									
2391	30.68	PK	H	28.4	3.57	0	62.65	74	-11.35
2391	13.54	AV	H	28.4	3.57	0	45.51	54	-8.49
2391	31.57	PK	V	28.4	3.57	0	63.54	74	-10.46
2391	14.69	AV	V	28.4	3.57	0	46.66	54	-7.34
2400	26.35	PK	H	28.4	3.57	0	58.32	74	-15.68
2400	13.24	AV	H	28.4	3.57	0	45.21	54	-8.79
2400	27.72	PK	V	28.4	3.57	0	59.69	74	-14.31
2400	13.46	AV	V	28.4	3.57	0	45.43	54	-8.57
4804	53.28	PK	H	32.3	5.91	30.97	60.52	74	-13.48
4804	37.64	AV	H	32.3	5.91	30.97	44.88	54	-9.12
4804	54.25	PK	V	32.3	5.91	30.97	61.49	74	-12.51
4804	38.42	AV	V	32.3	5.91	30.97	45.66	54	-8.34
7206	45.34	PK	H	36.3	6.34	30.86	57.12	74	-16.88
7206	33.16	AV	H	36.3	6.34	30.86	44.94	54	-9.06
7206	46.83	PK	V	36.3	6.34	30.86	58.61	74	-15.39
7206	35.79	AV	V	36.3	6.34	30.86	47.57	54	-6.43
369.3	45.67	QP	H	12.8	2.63	27.6	33.5	46	-12.5
369.3	48.35	QP	V	12.8	2.63	27.6	36.18	46	-9.82
Middle Channel (2440)									
4880	50.63	PK	H	32.6	6.15	31.78	57.6	74	-16.4
4880	38.16	AV	H	32.6	6.15	31.78	45.13	54	-8.87
4880	52.75	PK	V	32.6	6.15	31.78	59.72	74	-14.28
4880	39.47	AV	V	32.6	6.15	31.78	46.44	54	-7.56
7320	47.21	PK	H	36.7	6.22	30.97	59.16	74	-14.84
7320	37.16	AV	H	36.7	6.22	30.97	49.11	54	-4.89
7320	48.55	PK	V	36.7	6.22	30.97	60.5	74	-13.5
7320	38.08	AV	V	36.7	6.22	30.97	50.03	54	-3.97
9760	43.25	PK	H	38.2	8.11	30.86	58.7	74	-15.3
9760	31.83	AV	H	38.2	8.11	30.86	47.28	54	-6.72
9760	45.17	PK	V	38.2	8.11	30.86	60.62	74	-13.38
9760	32.59	AV	V	38.2	8.11	30.86	48.04	54	-5.96
369.6	44.09	QP	H	12.8	2.63	27.6	31.92	46	-14.08
369.6	46.18	QP	V	12.8	2.63	27.6	34.01	46	-11.99

High Channel (2480)									
2483.5	51.67	PK	H	32.6	6.15	31.78	58.64	74	-15.36
2483.5	40.12	AV	H	32.6	6.15	31.78	47.09	54	-6.91
2483.5	52.34	PK	V	32.6	6.15	31.78	59.31	74	-14.69
2483.5	41.21	AV	V	32.6	6.15	31.78	48.18	54	-5.82
4960	47.46	PK	H	36.7	6.22	30.97	59.41	74	-14.59
4960	35.04	AV	H	36.7	6.22	30.97	46.99	54	-7.01
4960	47.82	PK	V	36.7	6.22	30.97	59.77	74	-14.23
4960	35.29	AV	V	36.7	6.22	30.97	47.24	54	-6.76
7440	46.19	PK	H	38.2	8.11	30.86	61.64	74	-12.36
7440	29.65	AV	H	38.2	8.11	30.86	45.1	54	-8.9
7440	47.09	PK	V	38.2	8.11	30.86	62.54	74	-11.46
7440	30.64	AV	V	38.2	8.11	30.86	46.09	54	-7.91
369.4	44.95	QP	H	12.8	2.63	27.2	33.18	46	-12.82
369.4	45.19	QP	V	12.8	2.63	27.2	33.42	46	-12.58

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss-Amp Gain

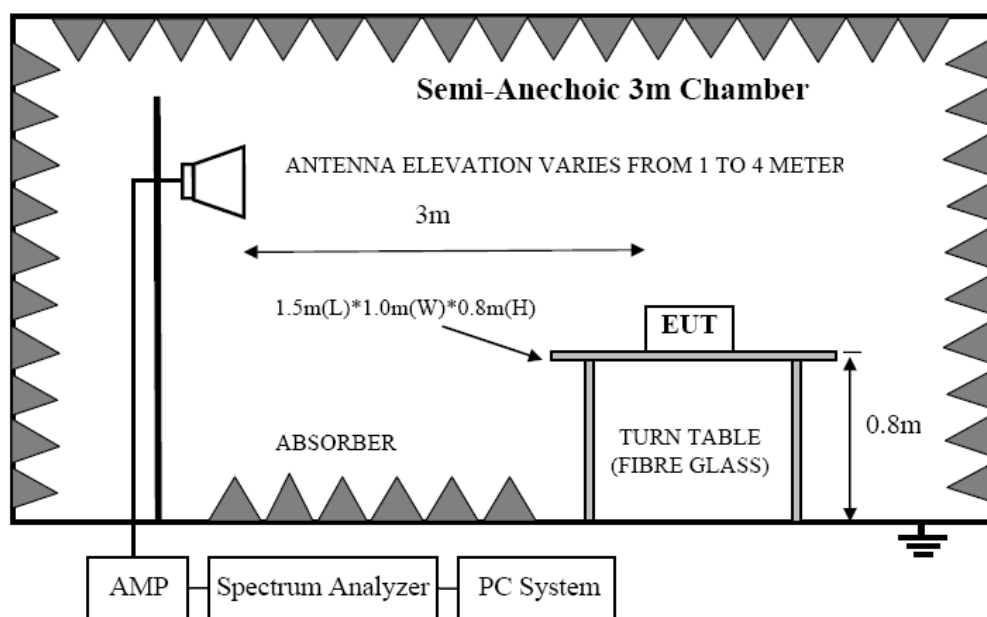
2. If Peak Result comply with QP limit, QP Result is deemed to comply with QP limit

7 Band Edge

7.1 Test equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Due.	Cal. Interval
1	EMI Test Receiver	R&S	ESU8	100316	2015/12/26	1 Year
2	Spectrum analyzer	R&S	FSU	1166.1660.26	2016/07/11	1 Year
3	Trilog Broadband Antenna	Schwarzbeck	VULB9163	9163-462	2015/12/26	1 Year
4	Double Ridged Horn Antenna	R&S	HF907	100276	2015/12/26	1 Year
5	Pre-amplifier	A.H.	PAM0-0118	360	2015/12/26	1 Year
6	RF Cable	R&S	R01	10403	2015/12/26	1 Year
7	RF Cable	R&S	R02	10512	2015/12/26	1 Year

7.2 Block diagram of test setup



7.3 Limit

All the lower and upper band-edges emissions appearing within 2310MHz to 2390MHz and 2483.5MHz to 2500MHz restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions outside operation frequency band 2400MHz to 2483.5MHz shall be at least 30dB below the fundamental emissions, or comply with 15.209 limits.

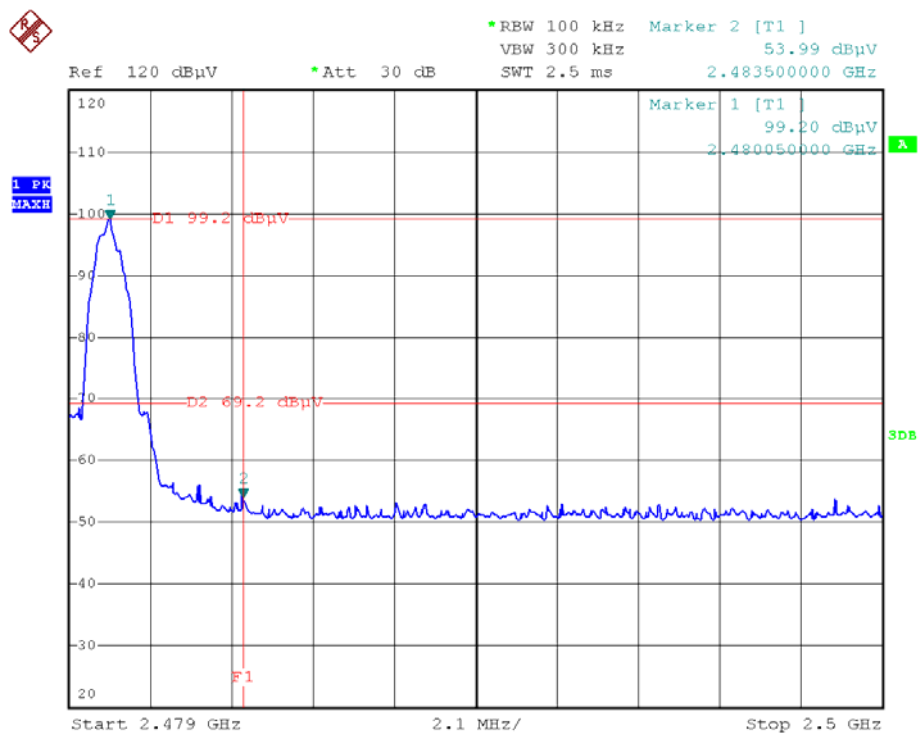
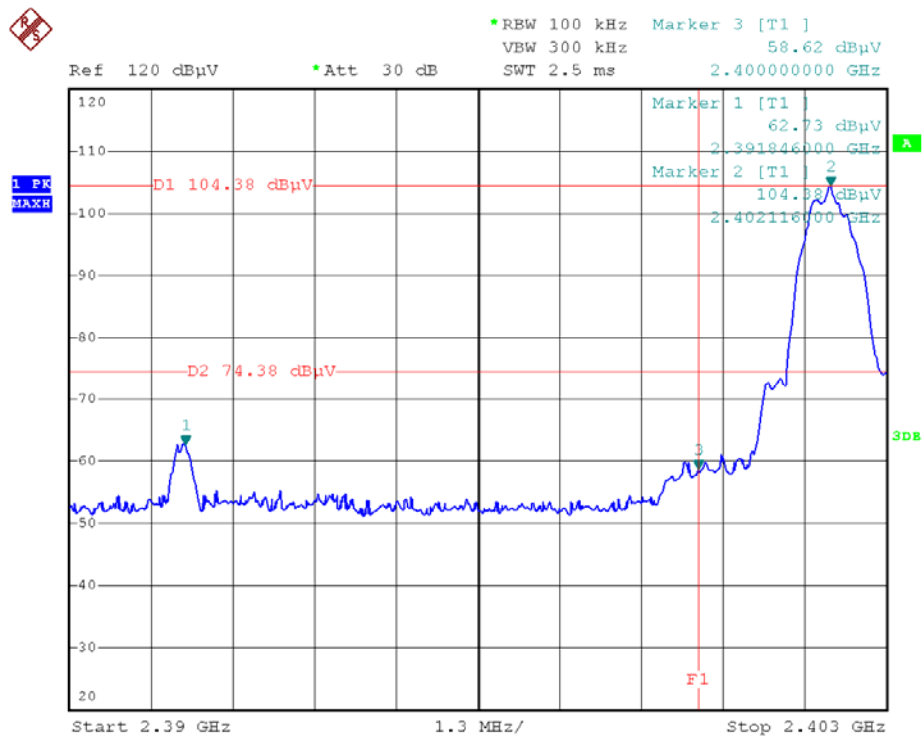
7.4 Test Procedure

Same with clause 8.4 except change investigated frequency range from 2100MHz to 2450MHz and 2450MHz to 2500MHz.

Remark: All restriction band have been tested, and only the worse case is shown in report.

7.5 Test result

PASS. (See below detailed test result)

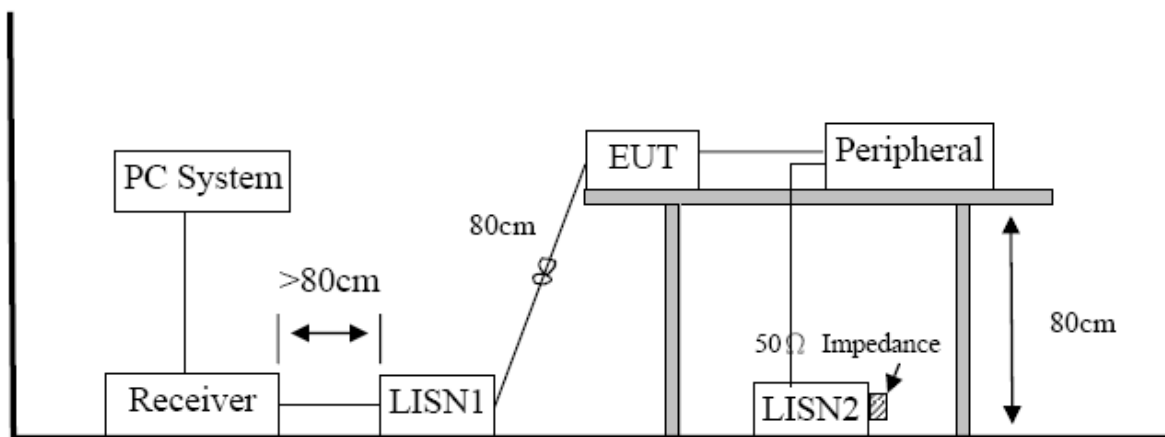


8 Conducted Emission

8.1 Test equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Due.	Cal. Interval
	Test Receiver	R&S	ESU8	100316	2015/12/26	1 Year
2	LISN 1	R&S	ENV216	101109	2015/12/26	1 Year
3	LISN 2	R&S	ESH2-Z5	100309	2015/12/26	1 Year
4	Pulse Limiter	R&S	ESH3-Z2	101242	2015/12/26	1 Year

8.2 Block diagram of test setup



8.3 Power Line Conducted Emission Limits(Class B)

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

Note 1: * Decreasing linearly with logarithm of frequency.

Note 2: The lower limit shall apply at the transition frequencies.

8.4 Test Procedure

The EUT and Support equipment, if needed, were put placed on a non-metallic table, 80cm above the ground plane.

Configuration EUT to simulate typical usage as described in clause 2.4 and test equipment as described in clause 10.2 of this report.

All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.

All support equipment power received from a second LISN.

Emissions were measured on each current carrying line of the EUT using an EMI Test Receiver connected to the LISN powering the EUT.

The Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.

During the above scans, the emissions were maximized by cable manipulation.

The test mode(s) described in clause 2.4 were scanned during the preliminary test.

After the preliminary scan, we found the test mode producing the highest emission level.

The EUT configuration and worse cable configuration of the above highest emission levels were recorded for reference of the 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, Neutral and Line, 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.

The bandwidth of test receiver is set at 9 KHz.

8.5 Test Result

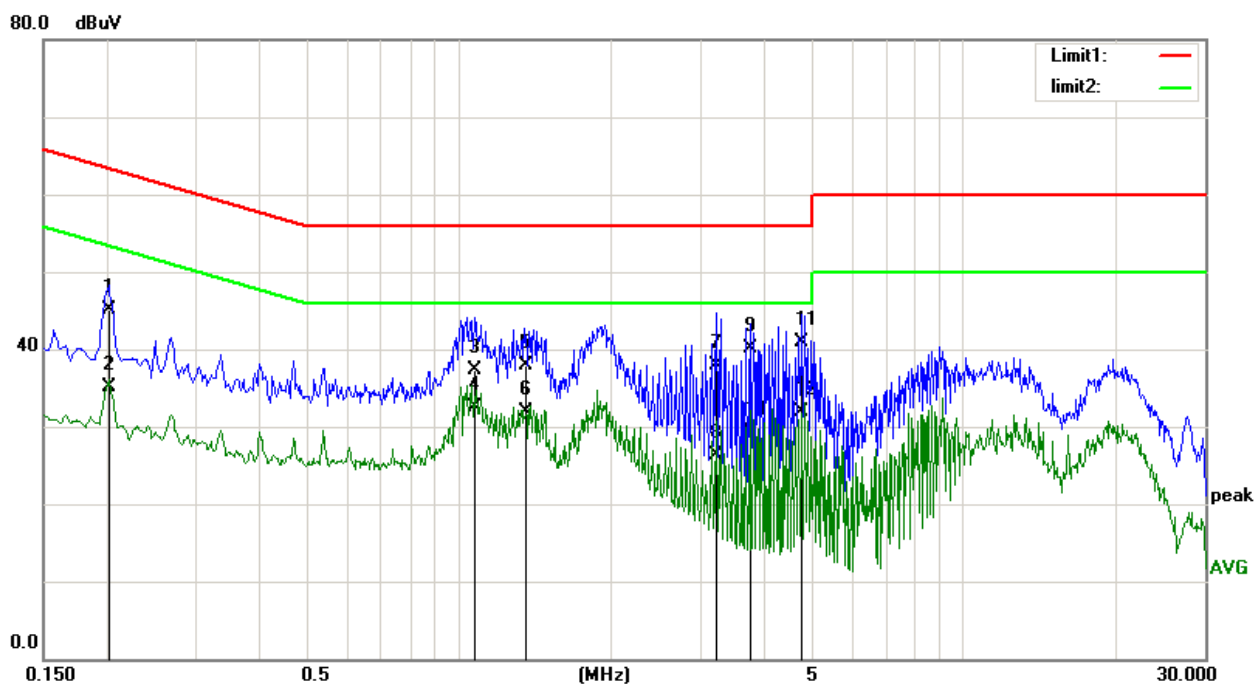
PASS. (See below detailed test result)

Note1: All emissions not reported below are too low against the prescribed limits.

Note2: "----" means peak detection; "----" mans average detection

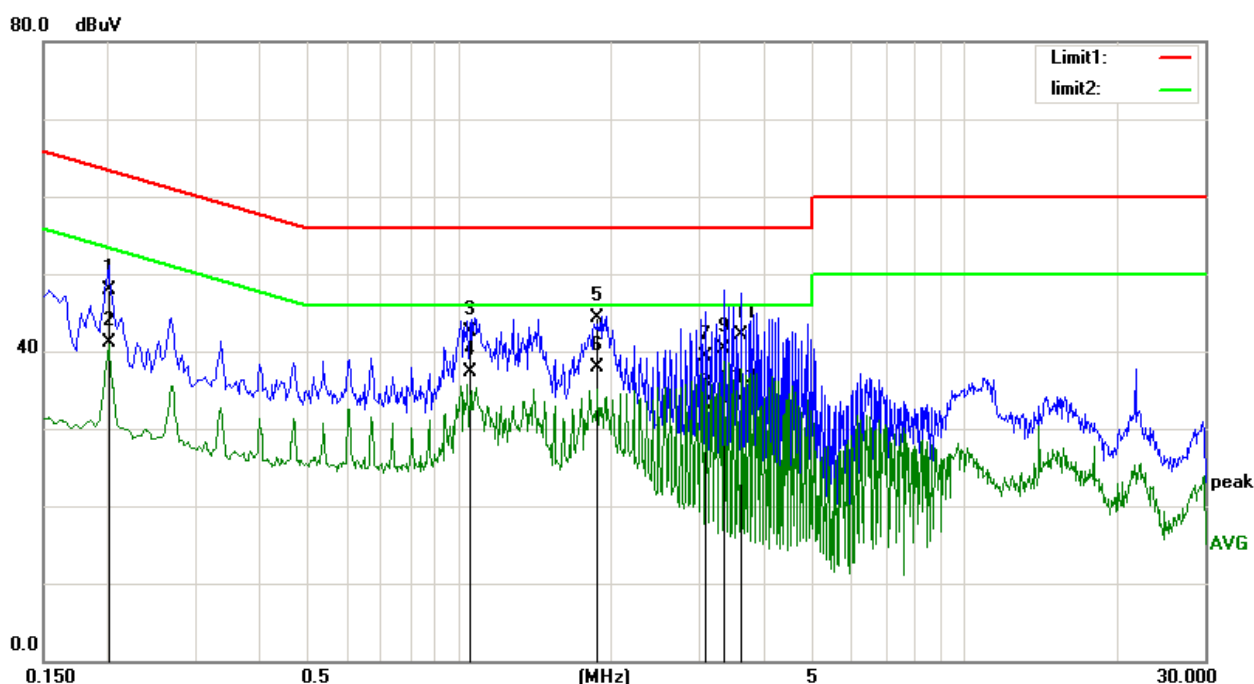
Conducted Emission Test Result

EUT:	Game Tracker	Model No.:	GT2
Temperature:	24°C	Relative Humidity:	55%
Probe:	L1	Test Power:	Via PC USB supply
Standard:	(CE)FCC PART 15 class B_QP	Test Result:	Pass
Test Mode:	Keeping Tx	Test By:	Sandy
Note:	PC Mains		



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.2014	33.67	11.34	45.01	63.55	-18.54	QP
2	0.2014	23.68	11.34	35.02	53.55	-18.53	AVG
3	1.0742	27.28	10.10	37.38	56.00	-18.62	QP
4	1.0742	22.31	10.10	32.41	46.00	-13.59	AVG
5	1.3592	27.70	10.13	37.83	56.00	-18.17	QP
6	1.3592	21.75	10.13	31.88	46.00	-14.12	AVG
7	3.2279	27.63	10.33	37.96	56.00	-18.04	QP
8	3.2279	16.02	10.33	26.35	46.00	-19.65	AVG
9	3.7634	29.76	10.37	40.13	56.00	-15.87	QP
10	3.7634	18.94	10.37	29.31	46.00	-16.69	AVG
11	4.7721	30.46	10.46	40.92	56.00	-15.08	QP
12	4.7721	21.42	10.46	31.88	46.00	-14.12	AVG

EUT:	Game Tracker	Model No.:	GT2
Temperature:	24°C	Relative Humidity:	55%
Probe:	N	Test Power:	Via PC USB supply
Standard:	(CE)FCC PART 15 class B_QP	Test Result:	Pass
Test Mode:	Keeping Tx	Test By:	Sandy
Note:	PC Mains		



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.2022	36.55	11.33	47.88	63.52	-15.64	QP
2	0.2022	29.77	11.33	41.10	53.52	-12.42	AVG
3	1.0551	32.41	10.09	42.50	56.00	-13.50	QP
4	1.0551	27.30	10.09	37.39	46.00	-8.61	AVG
5	1.8817	34.17	10.19	44.36	56.00	-11.64	QP
6	1.8817	27.66	10.19	37.85	46.00	-8.15	AVG
7	3.0892	29.00	10.31	39.31	56.00	-16.69	QP
8	3.0892	22.86	10.31	33.17	46.00	-12.83	AVG
9	3.3601	30.02	10.34	40.36	56.00	-15.64	QP
10	3.3601	23.13	10.34	33.47	46.00	-12.53	AVG
11	3.6279	31.72	10.37	42.09	56.00	-13.91	QP
12	3.6279	23.34	10.37	33.71	46.00	-12.29	AVG

9 Antenna Requirements

9.1 Limit

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

9.2 Result

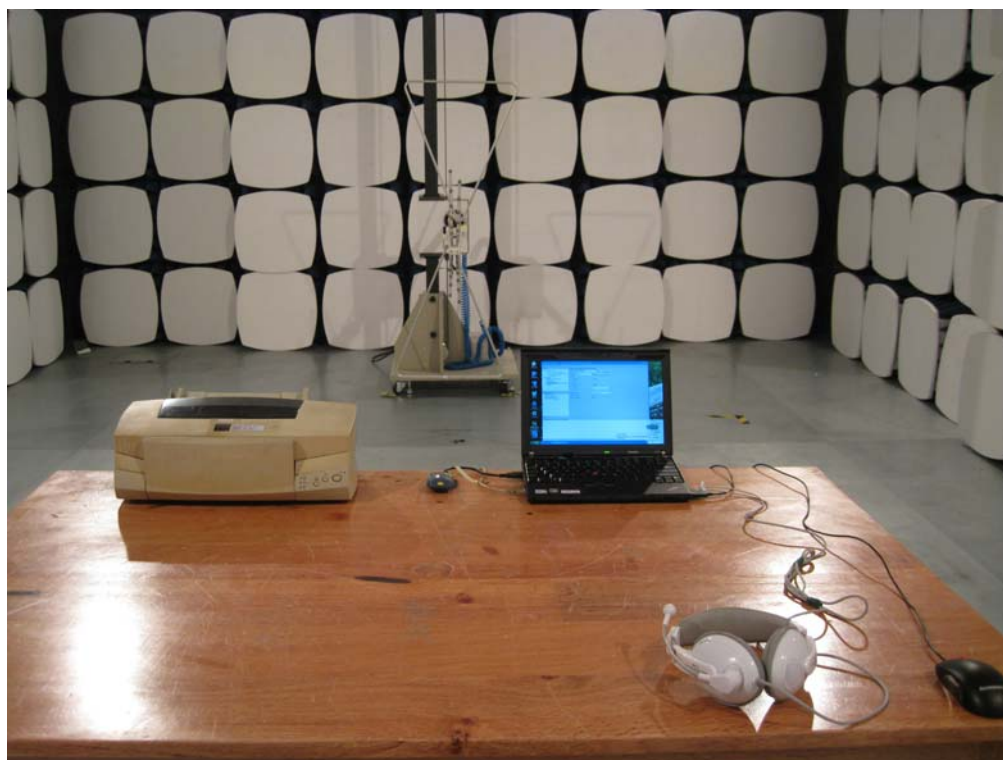
The antennas used for this product are dipole antenna and other than that furnished by the responsible party shall be used with the device, the maximum peak gain of the transmit antenna is only 0dBi.

10 Test setup photograph

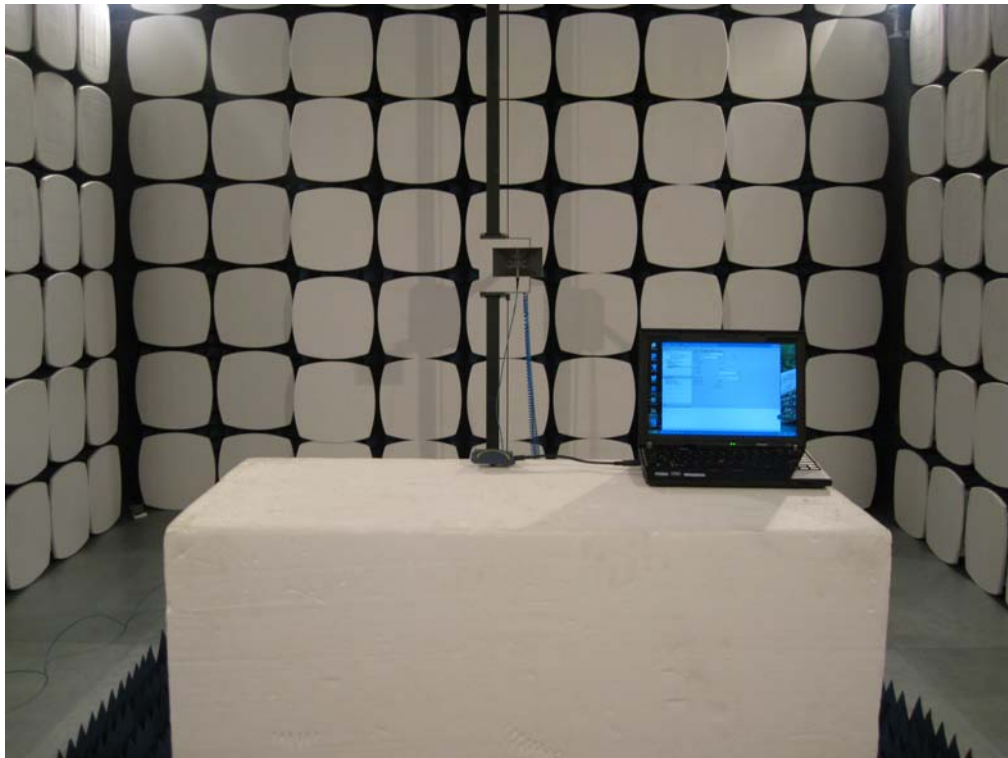
Conducted Measurement Photos



Radiated Measurement Photos (30MHz~1GHz)



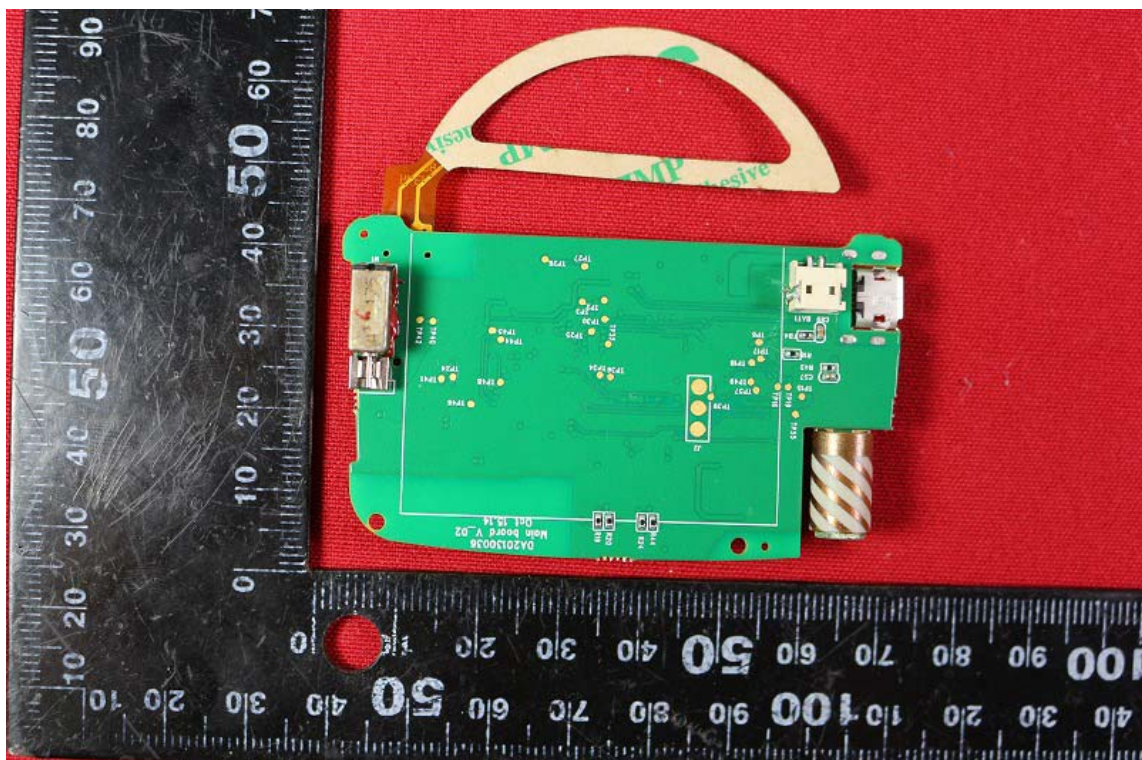
Radiated Measurement Photos (Above 1GHz)

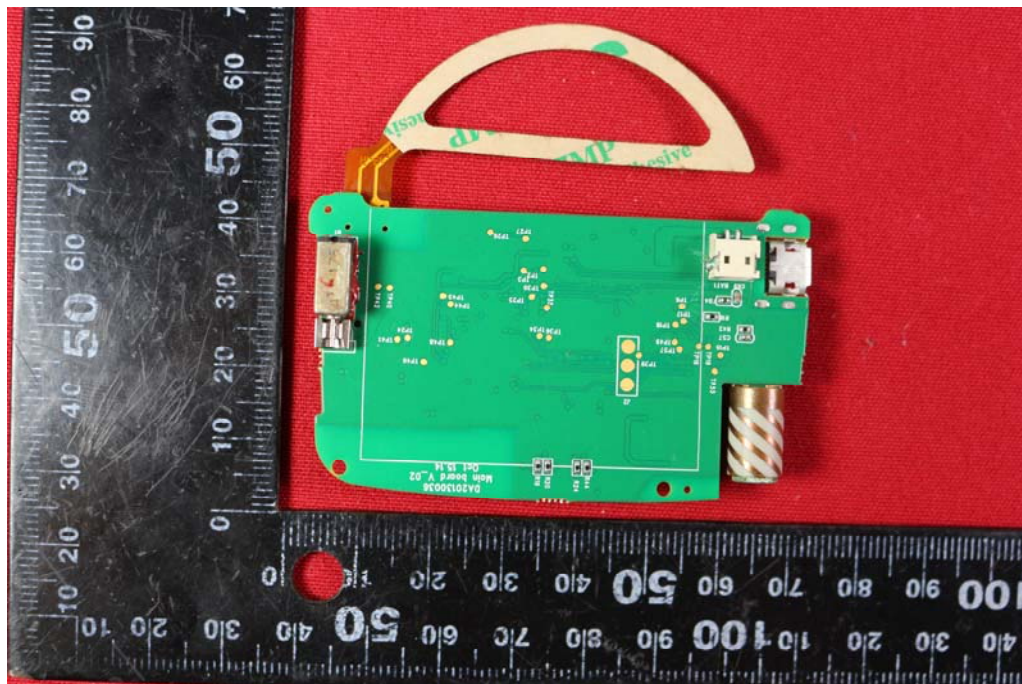


11 Photos of the EUT









END OF REPORT