

Test Report of FCC Part 15 C for FCC Certificate

On Behalf of

Sunbobo Digital CO.LTD;

FCC ID: YGD-G2216

Product Description: Car Media Player

Model No.: G2216

Supplementary Model No.: D2216(the difference of all models is apperance)

Prepared for: **Sunbobo Digital CO.LTD;**

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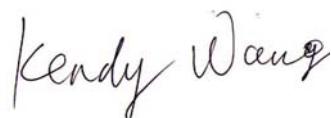
Report No.: BCT11DR-0460E

Issue Date: April 25, 2011

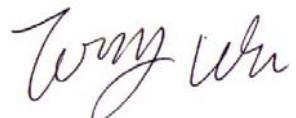
Test Date: April 12~25, 2011

Test by:

Reviewed By:



Kendy Wang



Tony Wu

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1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant: **Sunbobo Digital CO.LTD;**
Address of applicant: Block D, 2/F,Victorious Factory Bldg.35 Tseuk Luk Street, San Po Kong, Kowloon, Hong Kong
Manufacturer: **Sunbobo Digital CO.LTD;**
Address of manufacturer: Block D, 2/F,Victorious Factory Bldg.35 Tseuk Luk Street, San Po Kong, Kowloon, Hong Kong

General Description of E.U.T

Items	Description
EUT Description:	Car Media Player
Model No.:	G2216
Supplementary Model No.:	D2216(the difference of all models is apperance)
Type of Modulation:	FHSS
Frequency Band:	2402 MHz ~ 2480 MHz
Number of Channels:	79
Channel Bandwidth:	1 MHz
Antenna Type:	Built-in Antenna
Rated Voltage:	DC 13.8V

* The test data gathered are from the production sample provided by the manufacturer.

1.2 Related Submittal(s) / Grant (s)

This submittal(s) is a test report based on the Electromagnetic Interference (EMI) tests performed on the EUT. The EMI measurements were performed according to the measurement procedure described in ANSI C63.4 - 2009.

The tests were performed in order to determine compliance with FCC Part 15, Subpart C, and section 15.203, 15.207, and 15.247 rules.

1.3 Test Methodology

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4 - 2009, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz. Radiated testing was performed at an antenna to EUT distance 3 meters.

1.4 Test Facility

All measurement required was performed at laboratory of Bontek Compliance Testing Laboratory Ltd at 1/F, Block East H-3, OCT Eastern Ind. Zone, Qiaocheng East Road, Nanshan, Shenzhen, China.

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

FCC – Registration No.: 338263

BONTEK COMPLIANCE TESTING LABORATORY LTD. , EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 338263, March, 2008.

IC Registration No.: 7631A

The 3m alternate test site of BONTEK COMPLIANCE TESTING LABORATORY LTD. EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration NO.: 7631A on August 2009.

CNAS - Registration No.: L3923

BONTEK COMPLIANCE TESTING LABORATORY LTD. to ISO/IEC 17025:25 General Requirements for the Competence of Testing and Calibration Laboratories(CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.The acceptance letter from the CNAS is maintained in our files: Registration:L3923,February,2009.

TUV - Registration No.: UA 50145371-0001

BONTEK COMPLIANCE TESTING LABORATORY LTD. An assessment of the laboratory was conducted according to the"Procedures and Conditions for EMC Test Laboratories"with reference to EN ISO/IEC 17025 by a TUV Rheinland auditor. Audit Report NO. 17010783-001

2. SYSTEM TEST CONFIGURATION

The tests documented in this report were performed in accordance with ANSI C63.4-2009 and FCC CFR 47 Part 15 Subpart C.

2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT Exercise

The calibrated antennas used to sample the radiated field strength are mounted on a non-conductive, motorized antenna mast 3 or 10 meters from the leading edge of the turntable.

2.3 General Test Procedures

Conducted Emissions The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 7.1 of ANSI C63.4-2009. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-Peak detector mode.

Radiated Emissions The EUT is placed on as turntable, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 13.1.4.1 of ANSI C63.4-2009.

2.4 List of Measuring Equipments Used

Test equipments list of SHENZHEN BONTEK ELECTRONIC TECHNOLOGY CO., LTD. .

No.	Instrument no.	Equipment	Manufacturer	Model No.	S/N	Calibration Date	Calibration Due Date
1	BCT-EMC001	EMI Test Receiver	R&S	ESCI	100687	2011-4-07	2012-4-06
2	BCT-EMC002	EMI Test Receiver	R&S	ESPI	100097	2011-4-07	2012-4-06
3	BCT-EMC003	Amplifier	HP	8447D	1937A02492	2011-4-07	2012-4-06
4	BCT-EMC004	Single Power Conductor Module	FCC	FCC-LISN-5-50-1-01-CISPR25	7101	2011-4-07	2012-4-06
5	BCT-EMC005	Single Power Conductor Module	FCC	FCC-LISN-5-50-1-01-CISPR25	7102	2011-4-07	2012-4-06
6	BCT-EMC006	Power Clamp	SCHWARZBECK	MDS-21	3812	2011-4-07	2012-4-06
7	BCT-EMC007	Positioning Controller	C&C	CC-C-1F	MF7802113	N/A	N/A
8	BCT-EMC008	Electrostatic Discharge Simulator	TESEQ	NSG437	125	2011-4-07	2012-4-06
9	BCT-EMC009	Fast Transient Burst Generator	SCHAFFNER	MODULA6150	34572	2011-4-07	2012-4-06
10	BCT-EMC010	Fast Transient Noise Simulator	Noiseken	FNS-105AX	31485	2011-4-07	2012-4-06
11	BCT-EMC011	Color TV Pattern Genenerator	PHILIPS	PM5418	TM209947	N/A	N/A
12	BCT-EMC012	Power Frequency Magnetic Field Generator	EVERFINE	EMS61000-8K	608002	2011-4-07	2012-4-06
14	BCT-EMC013	Capacitive Coupling Clamp	TESEQ	CDN8014	25096	2011-4-07	2012-4-06
15	BCT-EMC014	High Field Biconical Antenna	ELECTRO-METRICS	EM-6913	166	2010-4-14	2012-4-13
16	BCT-EMC015	Log Periodic Antenna	ELECTRO-METRICS	EM-6950	811	2010-4-14	2012-4-13
17	BCT-EMC016	Remote Active Vertical Antenna	ELECTRO-METRICS	EM-6892	304	2010-4-14	2012-4-13
18	BCT-EMC017	TRILOG Broadband Test-Antenna	SCHWARZBECK	VULB9163	9163-324	2010-4-14	2012-4-13
19	BCT-EMC018	Horn Antenna	SCHWARZBECK	BBHA9120A	B08000991-0001	2010-4-14	2012-4-13
20	BCT-EMC019	Teo Line Single Phase Module	SCHWARZBECK	NSLK8128	D-69250	2011-4-07	2012-4-06
21	BCT-EMC020	10dB attenuator	SCHWARZBECK	MTAIMP-136	R65.90.0001#06	2011-4-07	2012-4-06
22	BCT-EMC021	Electric bridge	Zentech	100 LCR METER	803024	N/A	N/A
23	BCT-EMC022	RF Current Probe	FCC	F-33-4	80	2011-4-07	2012-4-06

24	BCT-EMC023	Triple-Loop Antenna	EVERFINE	LLA-2	607004	2011-4-07	2012-4-06
25	BCT-EMC024	CDN	FRANKONIA	M2+M3	A3027019	2011-4-07	2012-4-06
26	BCT-EMC025	6dB Attenuator	FRANKONIA	75-A-FFN-06	1001698	2011-4-07	2012-4-06
27	BCT-EMC026	EMV-Mess-System GMBH	FRANKONIA	FLL-75	1020A1109	2011-4-07	2012-4-06
28	BCT-EMC027	EM Injection Clamp	FCC	F-203I-13mm	91536	2011-4-07	2012-4-06
29	BCT-EMC028	9KHz-2.4GHz Signal generator	MARCONI INSTRUMENTS	2024	112260/042	2011-4-07	2012-4-06
30	BCT-EMC029	Broadband Preamplifier	SCHWARZBECK	BBV 9718	9718-182	2011-4-07	2012-4-06
31	BCT-EMC030	Harmonics& Flicker Analyser	Voltech	PM6000	200006700433	2011-4-07	2012-4-06
32	BCT-EMC031	Spectrum Analyzer	R&S	FSP30	1093.4495.30	2011-4-07	2012-4-06

3. SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
15.207	Conducted Emission	Pass
15.247(a)(1)	Hopping Channel Bandwidth	Pass
15.247(a)(1)	Hopping Channel Separation	Pass
15.247(a)(1)	Number of Hopping Frequency Used	Pass
15.247(a)(1)(iii)	Dwell Time of Each Frequency	Pass
15.247(b)(1)	Maximum Peak Output Power	Pass
15.247(d)	Band Edges Emission	Pass
15.247(d)	Spurious Radiated Emission	Pass
15.203/15.247(b)/(c)	Antenna Requirement	Pass

4 – DISTURBANCE VOLTAGE AT THE MAINS TERMINALS

4.1 Measurement Uncertainty

All test results complied with Section 15.207 requirements. Measurement Uncertainty is 2.4 dB.

4.2 Applicable Standard

Section 15.207: For a Low-power Radio-frequency Device is designed to be connected to the AC power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed below limits table.

Frequency Range (MHz)	Limits (dBuV)	
	Quasi-Peak	Average
0.150~0.500	66~56	56~46
0.500~5.000	56	46
5.000~30.00	60	50

Note: (1)The tighter limit shall apply at the edge between two frequency bands.

4.3 EUT Setup

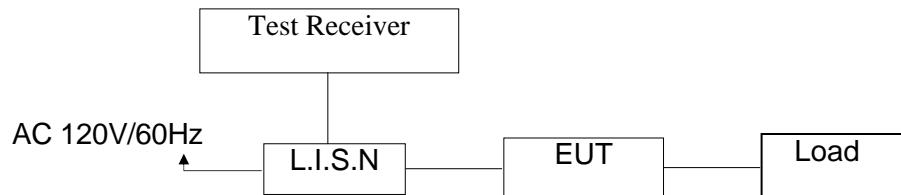
The setup of EUT is according with ANSI C63.4-2009 measurement procedure.

The EUT was placed center and the back edge of the test table.

The AV cables were draped along the test table and bundled to 30-40cm in the middle.

The spacing between the peripherals was 10 cm.

Maximum emission emitted from EUT was determined by manipulating the EUT, support equipment, interconnecting cables and varying the mode of operation and the levels in the final result of the test were recorded with the EUT running in the operating mode that maximum emission was emitted.



4.4 Instrument Setup

The test receiver was set with the following configurations:

Test Receiver Setting:

Frequency Range.....150 KHz to 30 MHz
Detector.....Peak & Quasi-Peak & Average
Sweep Speed.....Auto
IF Band Width.....9 KHz

4.5 Test Procedure

During the conducted emission test, the EUT power cord was connected to the auxiliary outlet of the first Artificial Mains.

Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance using all installation combination.

All data was recorded in the peak detection mode. Quasi-peak and Average readings were only performed when an emission was found to be marginal (within -10 dB μ V of specification limits). Quasi-peak readings are distinguished with a "QP". Average readings are distinguished with a "AV".

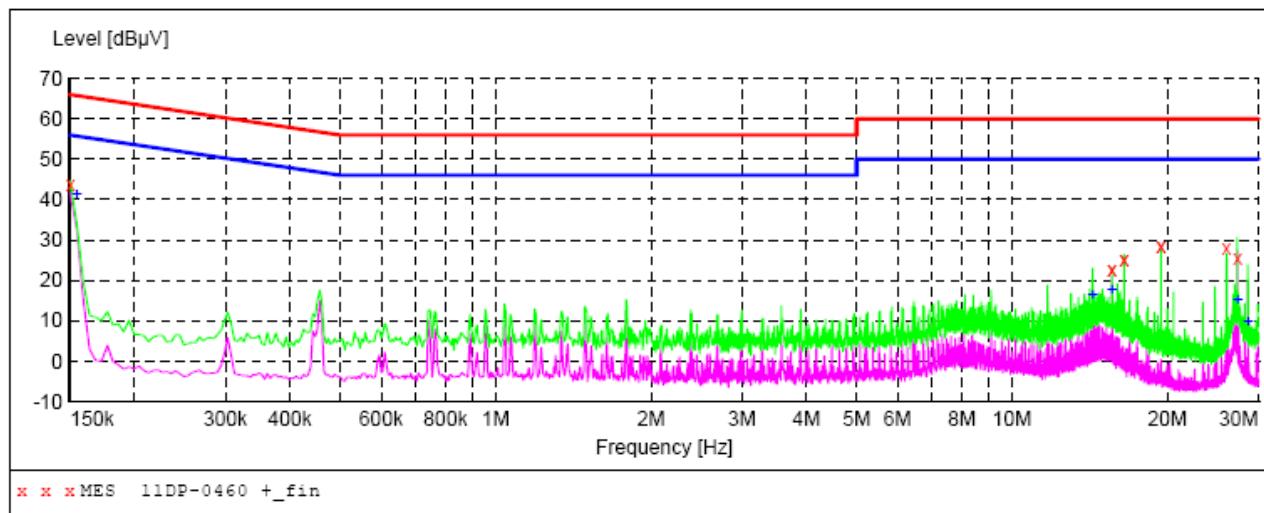
4.6 Test Result

PASS

Conducted Emission Test Data

EUT: Car Media Player
 M/N: G2216
 Operating Condition: Normal Operation
 Test Site: Shielded Room
 Operator: Cheng
 Test Specification: DC 13.8V
 Comment: + Line
 Start of Test: 4/13/11/15:32 Tem:25°C Hum:50%

SCAN TABLE: "Voltage (150K-30M) FIN"
 Short Description: 150K-30M Voltage



MEASUREMENT RESULT: "11DP-0460 +_fin"

4/13/2011 15:32

Frequency MHz	Level dB μ V	Transd dB	Limit dB μ V	Margin dB	Detector	Line	PE
0.150000	43.70	9.9	66	22.3	QP	+	GND
15.603000	22.00	9.7	60	38.0	QP	+	GND
16.494000	25.10	9.7	60	34.9	QP	+	GND
19.428000	29.00	9.8	60	31.0	QP	+	GND
26.007000	28.20	9.8	60	31.8	QP	+	GND
27.303000	25.70	9.9	60	34.3	QP	+	GND

MEASUREMENT RESULT: "11DP-0460 +_fin2"

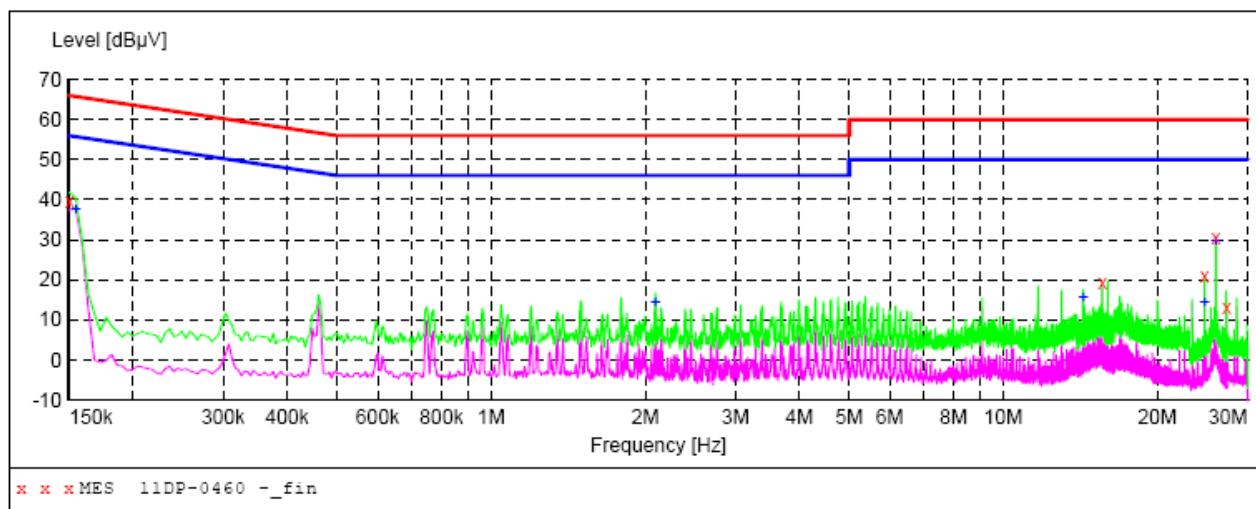
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Frequency MHz	Level dB μ V	Transd dB	Limit dB μ V	Margin dB	Detector	Line	PE
0.154500	41.30	9.9	56	14.5	AV	+	GND
14.302500	16.60	9.8	50	33.4	AV	+	GND
15.603000	17.60	9.7	50	32.4	AV	+	GND
27.303000	15.00	9.9	50	35.0	AV	+	GND
28.603500	9.90	10.0	50	40.1	AV	+	GND

Conducted Emission Test Data

EUT: Car Media Player
 M/N: G2216
 Operating Condition: Normal Operation
 Test Site: Shielded Room
 Operator: Cheng
 Test Specification: DC 13.8V
 Comment: - Line
 Start of Test: 4/13/11/15:35 Tem:25°C Hum:50%

SCAN TABLE: "Voltage (150K-30M) FIN"
 Short Description: 150K-30M Voltage



MEASUREMENT RESULT: "11DP-0460 -_fin"

4/13/2011 15:35

Frequency MHz	Level dB μ V	Transd dB	Limit dB μ V	Margin dB	Detector	Line	PE
0.150000	39.80	9.9	66	26.2	QP	-	GND
15.589500	19.10	9.7	60	40.9	QP	-	GND
24.679500	21.20	9.6	60	38.8	QP	-	GND
25.980000	30.50	9.8	60	29.5	QP	-	GND
27.280500	13.10	9.9	60	46.9	QP	-	GND

MEASUREMENT RESULT: "11DP-0460 -_fin2"

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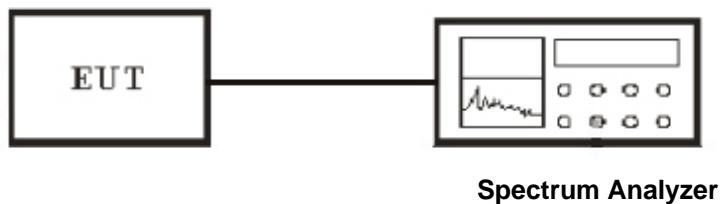
Frequency MHz	Level dB μ V	Transd dB	Limit dB μ V	Margin dB	Detector	Line	PE
0.154500	37.50	9.9	56	18.3	AV	-	GND
2.089500	14.40	9.9	46	31.6	AV	-	GND
14.289000	15.60	9.8	50	34.4	AV	-	GND
24.679500	14.50	9.6	50	35.5	AV	-	GND
25.975500	29.90	9.7	50	20.1	AV	-	GND

5. Test of Hopping Channel Bandwidth

5.1 Applicable Standard

Section 15.247(a)(1): Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

5.2 EUT Setup



5.3 Test Equipment List and Details

See section 2.4.

5.4 Test Procedure

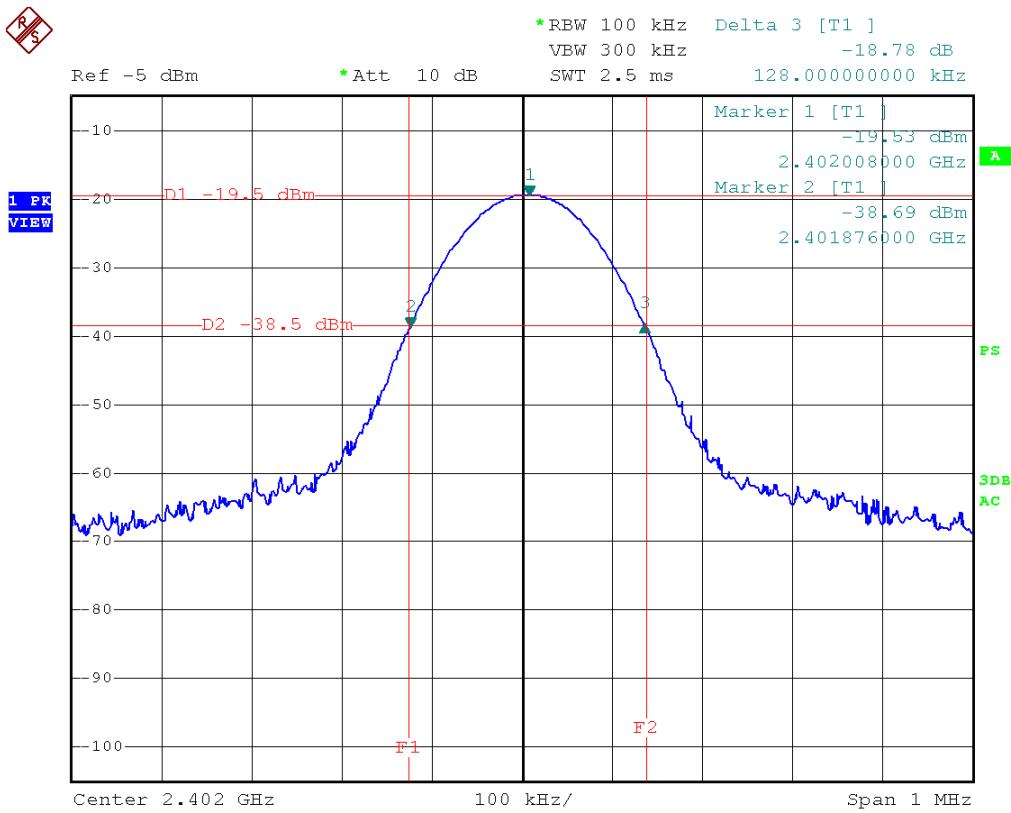
1. The transmitter output was connected to the spectrum analyzer through an attenuator.
2. Set RBW of spectrum analyzer to 30KHz and VBW to 100KHz.
3. Set Detector to Peak, Trace to Max Hold and Sweep Time is Auto.
4. The spectrum width with level higher than 20dB below the peak level.
5. Repeat above 1~3 points for the middle and highest channel of the EUT.

5.5 Test Result

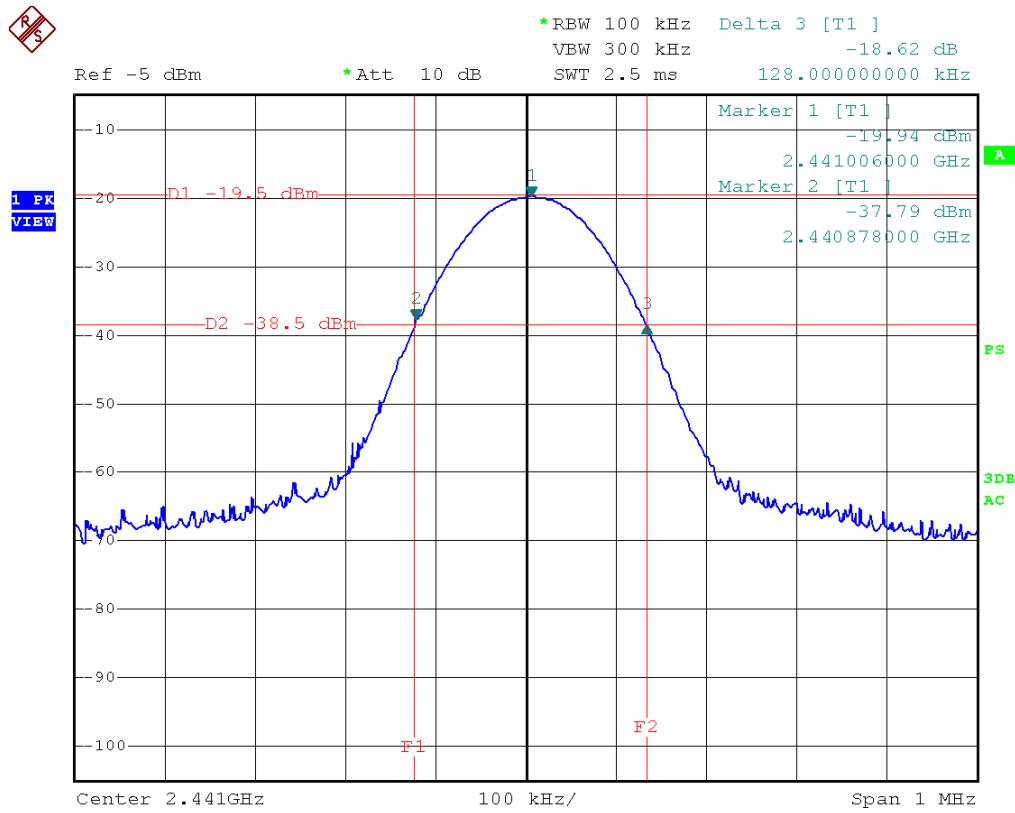
Temperature (°C) : 22~23	EUT: Car Media Player
Humidity (%RH) : 50~54	M/N: G2216
Barometric Pressure (mbar) : 950~1000	Operation Condition: Tx Mode

Modulation Type	Channel No.	Frequency (MHz)	20dB Bandwidth (kHz)	Min. Limit (kHz)
FHSS	Low	2402.00	256	>25
FHSS	Middle	2441.00	256	>25
FHSS	High	2480.00	264	>25

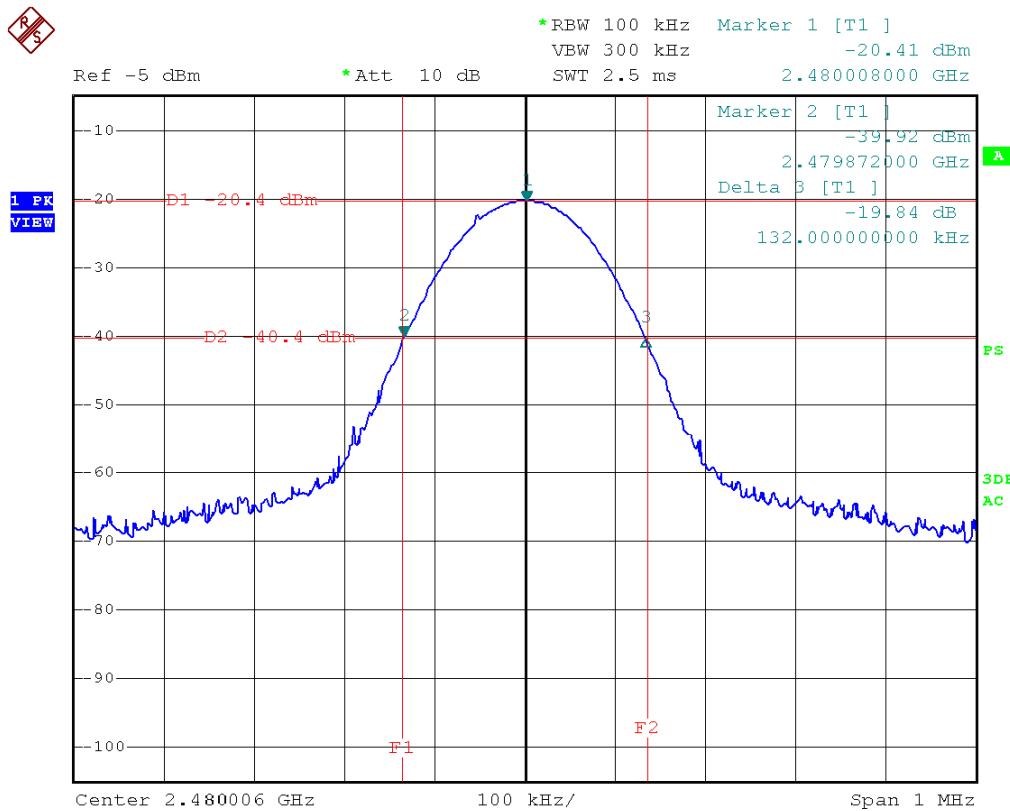
Channel Low :



Channel Middle :



Channel High :

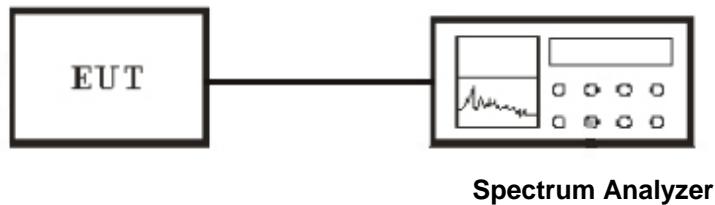


6. Test of Hopping Channel Separation

6.1 Applicable Standard

Section 15.247(a)(1): Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

6.2 EUT Setup



6.3 Test Equipment List and Details

See section 2.4.

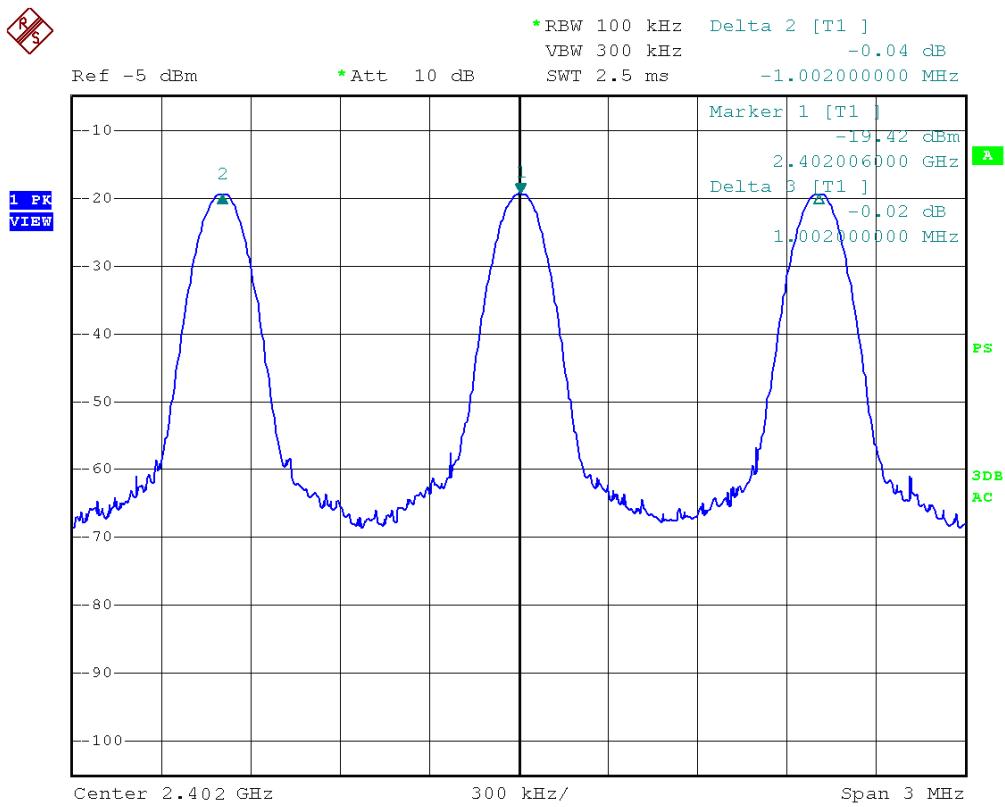
6.4 Test Procedure

1. The transmitter output was connected to the spectrum analyzer through an attenuator.
2. Set RBW of spectrum analyzer to 100KHz and VBW to 100KHz.
3. Set Detector to Peak, Trace to Max Hold and Sweep Time is Auto.
4. The Hopping Channel Separation is defined as the separation between 2 neighboring hopping frequencies.
5. Repeat above 1~3 points for the middle and highest channel of the EUT.

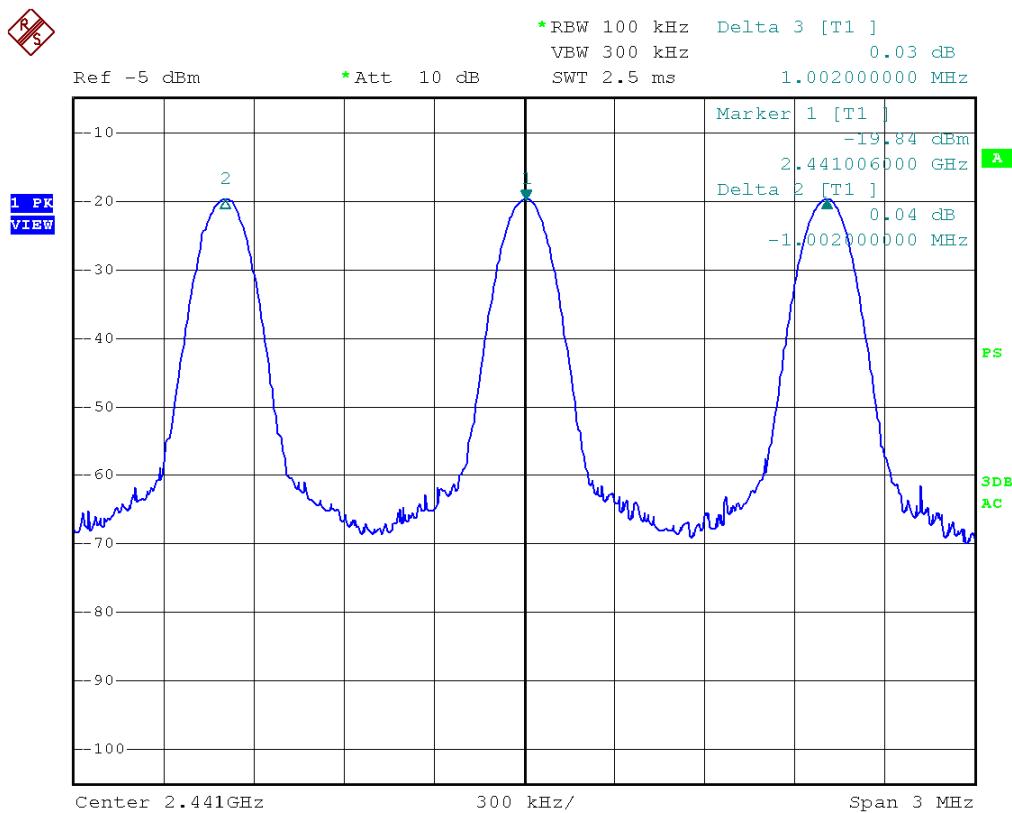
6.5 Test Result

Temperature (°C) : 22~23	EUT: Car Media Player
Humidity (%RH): 50~54	M/N: G2216
Barometric Pressure (mbar): 950~1000	Operation Condition: Tx Mode

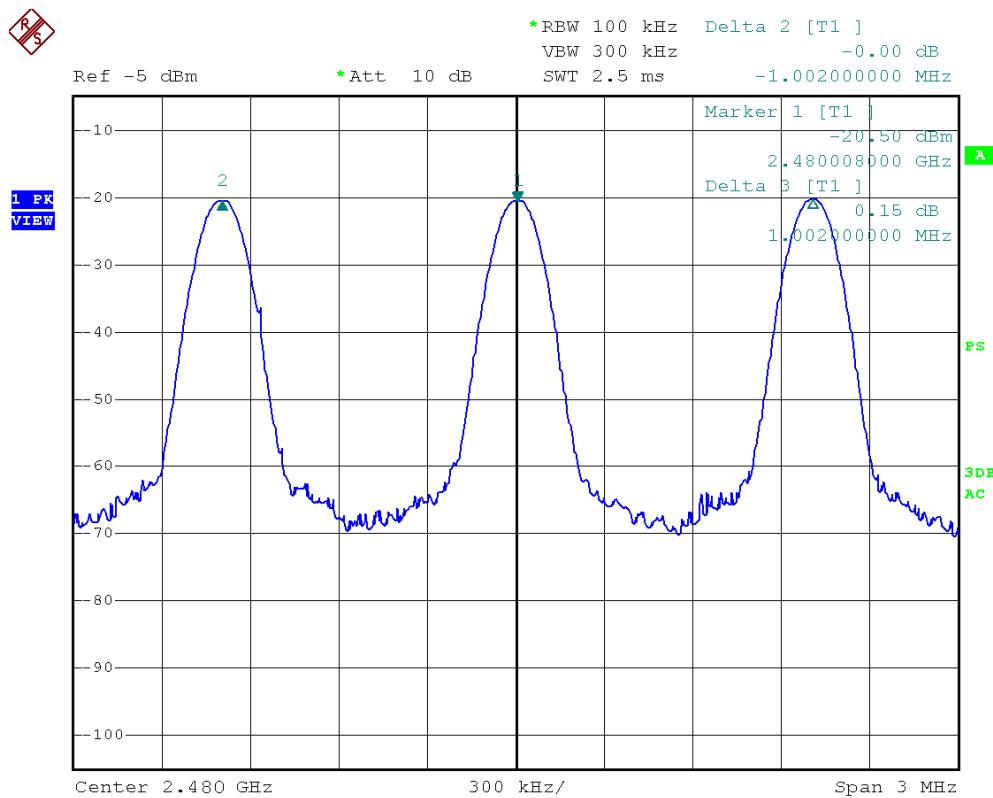
Channel Low :



Channel Middle :



Channel High :

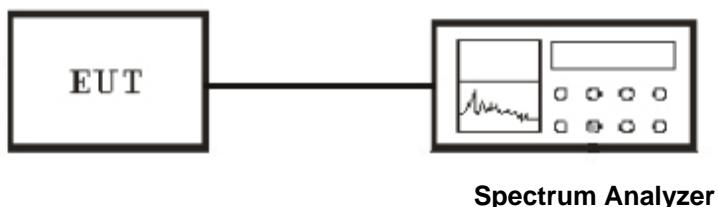


7. Test of Number of Hopping Frequency

7.1 Applicable Standard

Section 15.247(a)(1)(iii): For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 15 non-overlapping hopping channels. Frequency hopping system which use fewer than 75 hopping frequencies may employ intelligent hopping techniques to avoid interference to other transmissions. Frequency hopping system may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 non-overlapping channels are used.

7.2 EUT Setup



7.3 Test Equipment List and Details

See section 2.4.

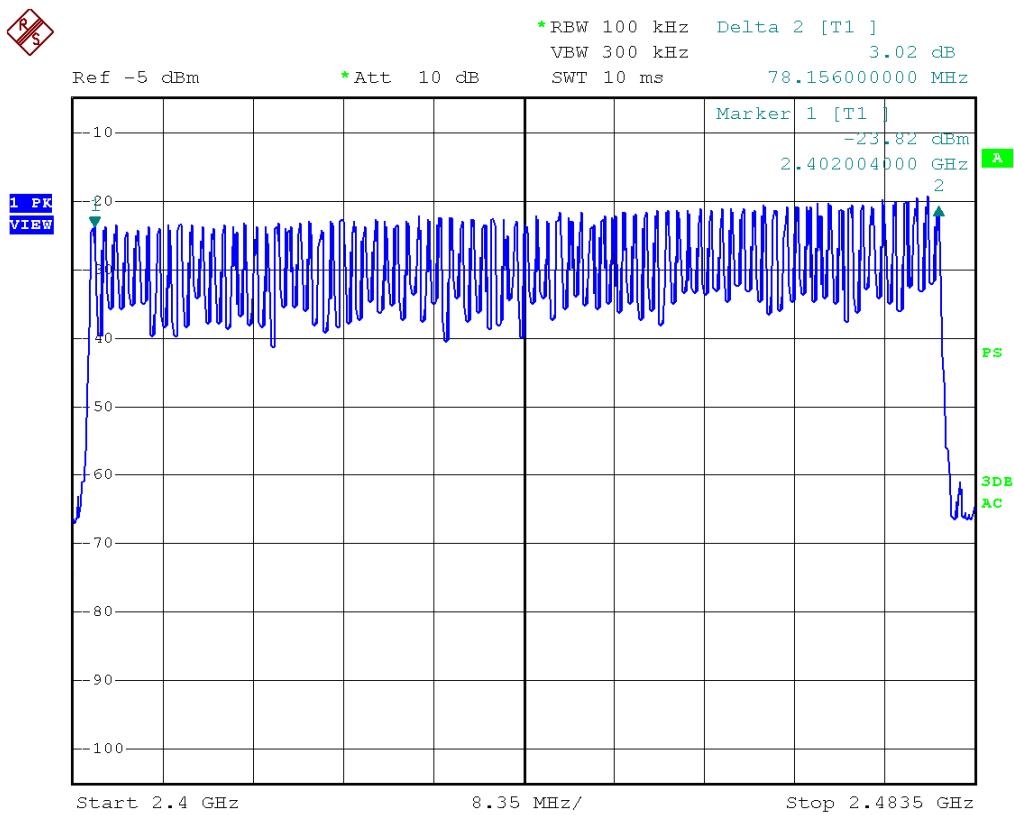
7.4 Test Procedure

1. The transmitter output was connected to the spectrum analyzer through an attenuator.
2. Set RBW of spectrum analyzer to 100KHz and VBW to 100KHz.
3. Set Detector to Peak, Trace to Max Hold and Sweep Time is Auto.
4. Observe frequency hopping in 2400MHz~2483.5MHz, there are at least 32 non-overlapping channels.
5. Repeat above 1~3 points for the middle and highest channel of the EUT.

7.5 Test Result

Temperature (°C) : 22~23	EUT: Car Media Player
Humidity (%RH) : 50~54	M/N: G2216
Barometric Pressure (mbar) : 950~1000	Operation Condition: Tx Mode

Modulation Type	Frequency (MHz)	Number of Hopping Channels	Min. Limit (kHz)
FHSS	2402.0~2480.0	79	>15

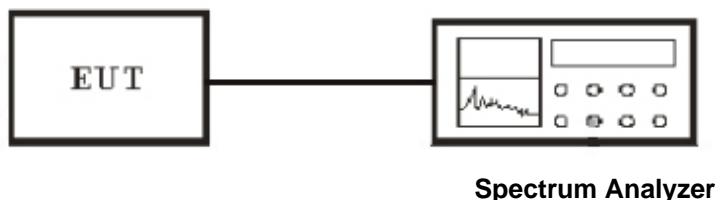


8. Test of Dwell Time of Each Frequency

8.1 Applicable Standard

Section 15.247(a)(1)(iii): For frequency hopping systems operating in the 2400-2483.5 MHz band The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4seconds multiplied by the number of hopping channels employed.

8.2 EUT Setup



8.3 Test Equipment List and Details

See section 2.4.

8.4 Test Procedure

1. The transmitter output was connected to the spectrum analyzer through an attenuator.
2. Set RBW of spectrum analyzer to 1000kHz and VBW to 1000kHz.
3. Set Detector to Peak, Trace to Max Hold and Sweep Time is more than once pulse time.
4. Set the center frequency on any frequency would be measure and set the frequency span to zero span.
5. Measure the maximum time duration of one single pulse.

8.5 Test Result

Temperature (°C) : 22~23	EUT: Car Media Player
Humidity (%RH) : 50~54	M/N: G2216
Barometric Pressure (mbar) : 950~1000	Operation Condition: Tx Mode

Modulation Type	Channel No.	Frequency (MHz)	Dwell Time (ms)	Limit (ms)
FHSS	Low	2402.00	115.20	400
FHSS	Middle	2441.00	119.04	400
FHSS	High	2480.00	119.04	400

A period time = 0.4 (ms) * 79 = 31.6 (s)

CH Low:

DH1 time slot = 0.360 (ms) * (1600/(2*79)) * 31.6 = 115.20 (ms)

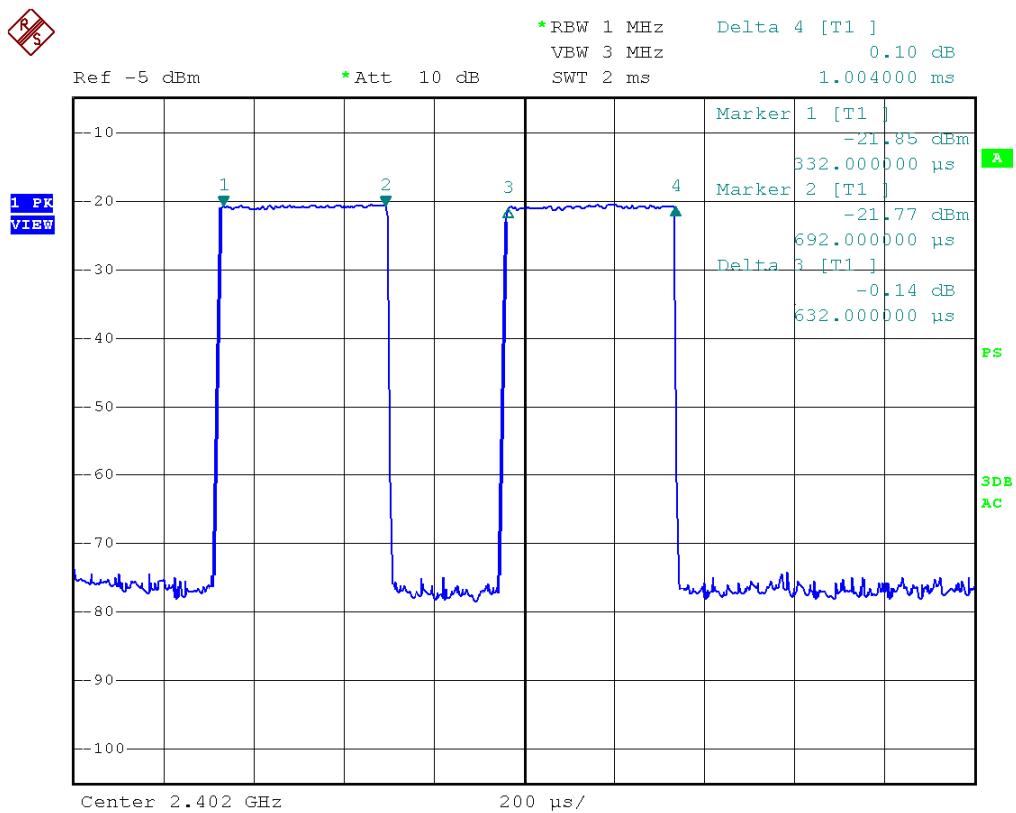
CH Mid:

DH1 time slot = 0.372 (ms) * (1600/(2*79)) * 31.6 = 119.04 (ms)

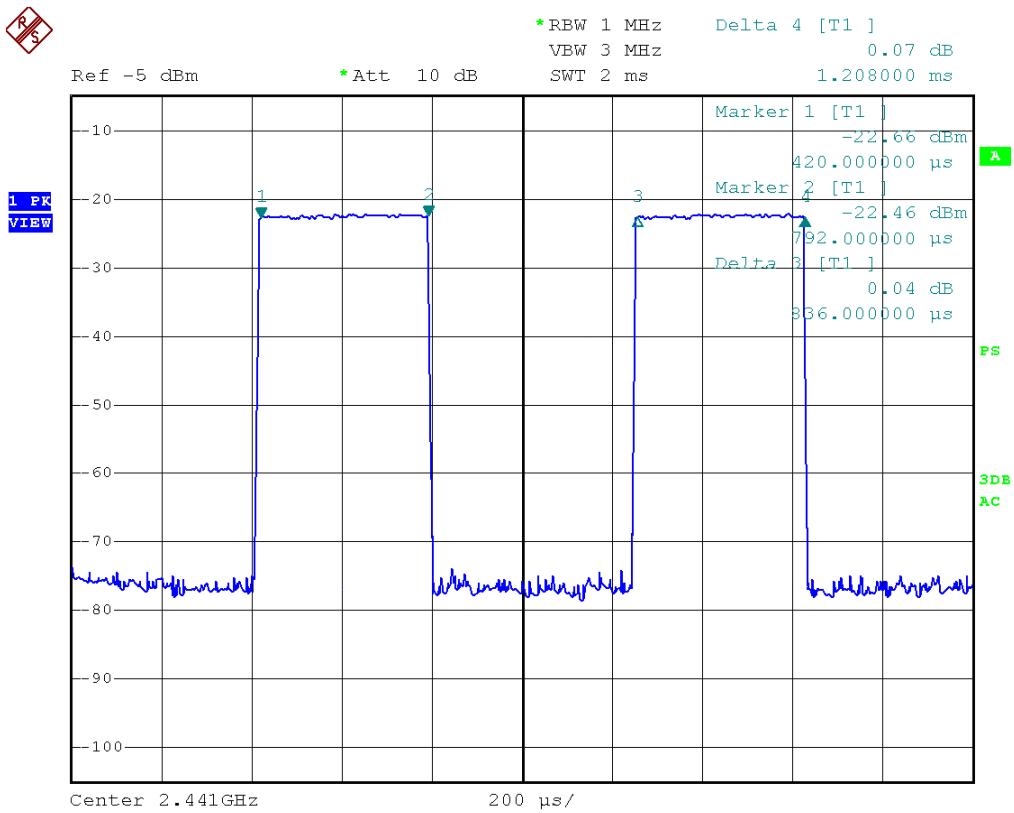
CH High:

DH1 time slot = 0.372 (ms) * (1600/(2*79)) * 31.6 = 119.04 (ms)

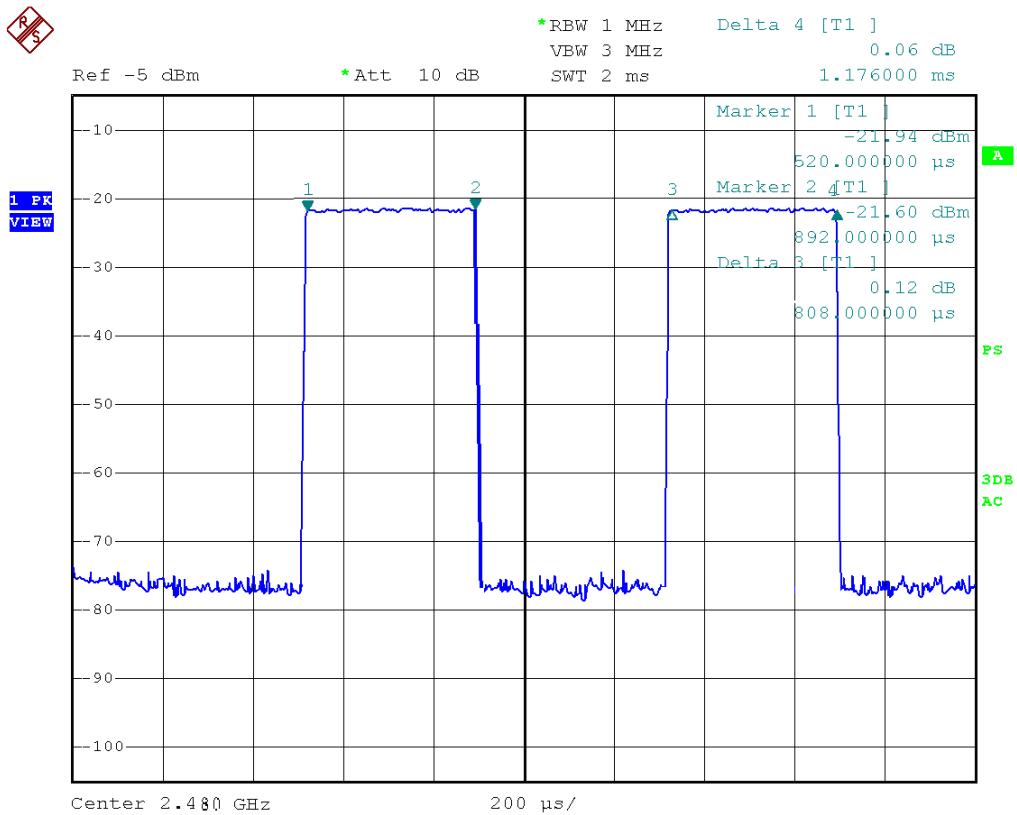
Channel Low :



Channel Middle :



Channel High :

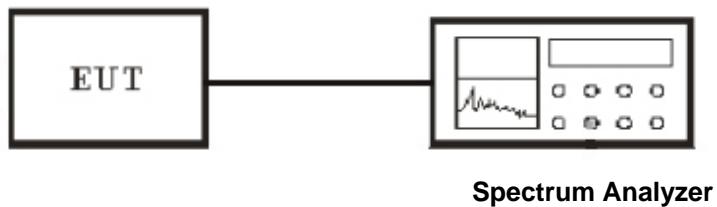


9. Test of Maximum Peak Output Power

9.1 Applicable Standard

Section 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 The maximum peak output power shall not exceed 1 watt. For all other frequency hopping systems in this frequency band, The maximum peak output power shall not exceed 0.125 watt.

9.2 EUT Setup



9.3 Test Equipment List and Details

See section 2.4.

9.4 Test Procedure

1. The transmitter output was connected to the peak power meter and recorded the peak value.
2. Peak power meter parameter set to auto attenuator and filter is the same as.
3. Repeated the 1 for the middle and highest channel of the EUT.

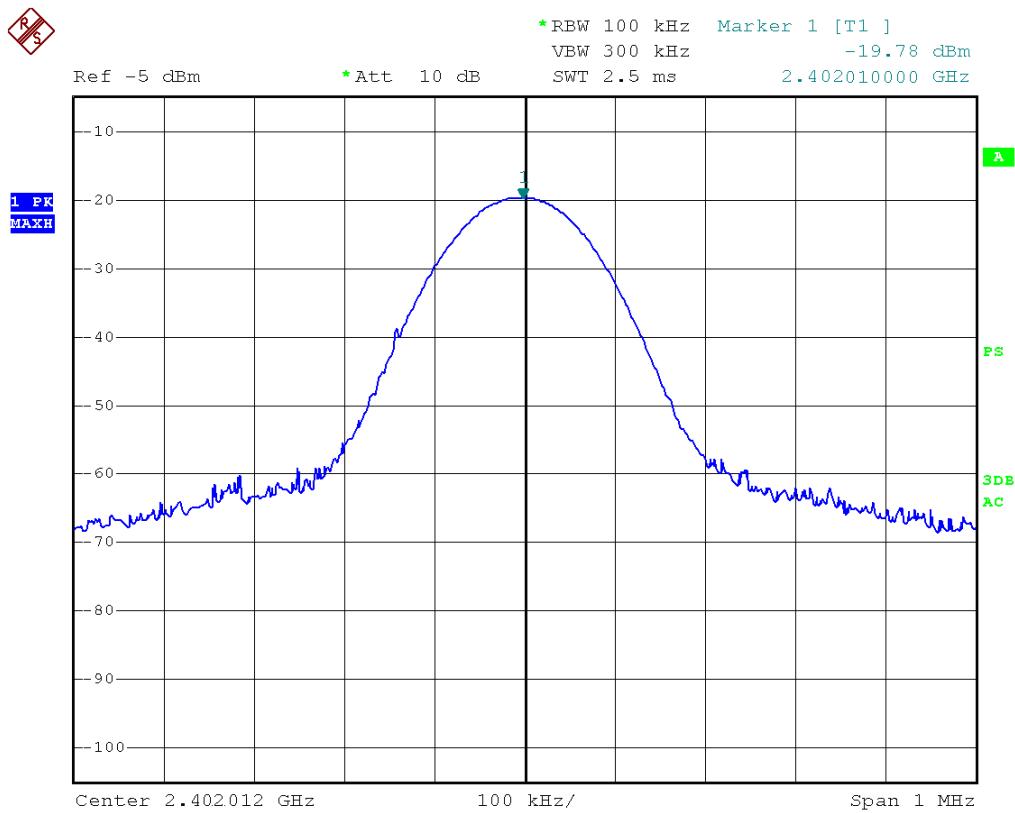
9.5 Test Result

Temperature (°C) : 22~23	EUT: Car Media Player
Humidity (%RH) : 50~54	M/N: G2216
Barometric Pressure (mbar) : 950~1000	Operation Condition: Tx Mode

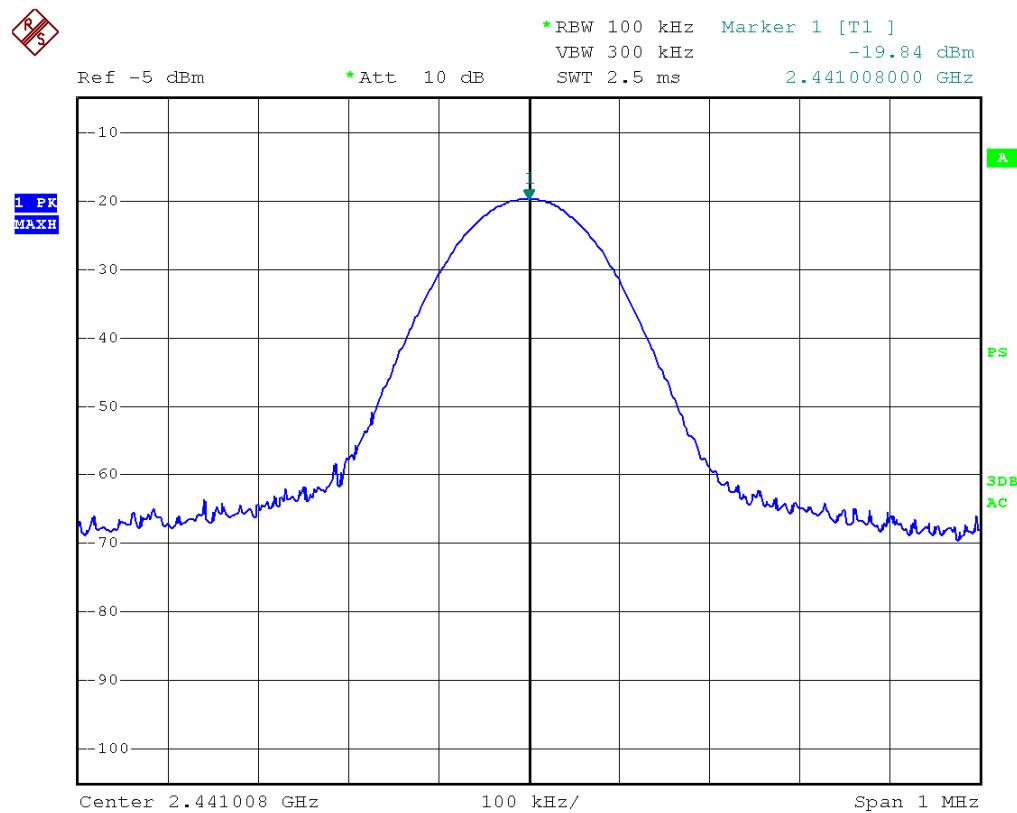
Modulation Type	Channel No.	Frequency (MHz)	Output Power (dBm)	Limits (dBm)	Margin (dB)
FHSS	Low	2402.00	-18.98	30	48.98
FHSS	Middle	2441.00	-19.94	30	49.94
FHSS	High	2480.00	-20.48	30	50.48

Modulation Type	Channel No.	Frequency (MHz)	Output Power (dBm)	Limits (dBm)	Margin (dB)
FHSS	Low	2402.00	-19.78	30	49.78
FHSS	Middle	2441.00	-19.84	30	49.84
FHSS	High	2480.00	-20.72	30	50.72

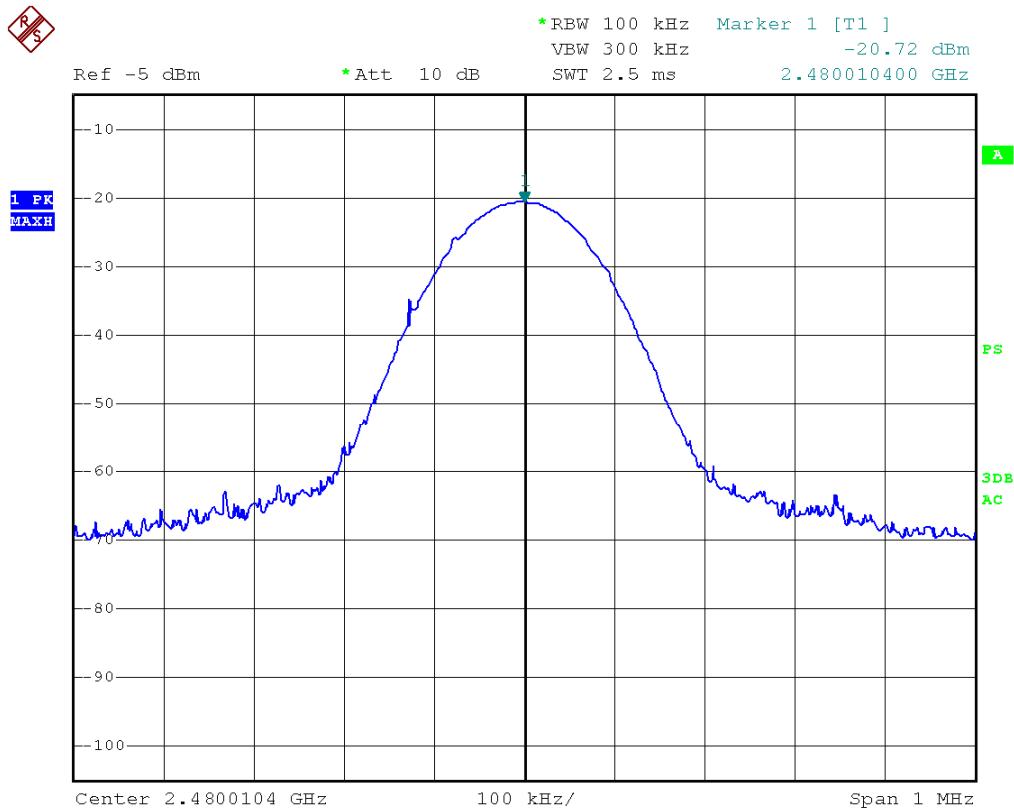
Channel Low :



Channel Middle :



Channel High :



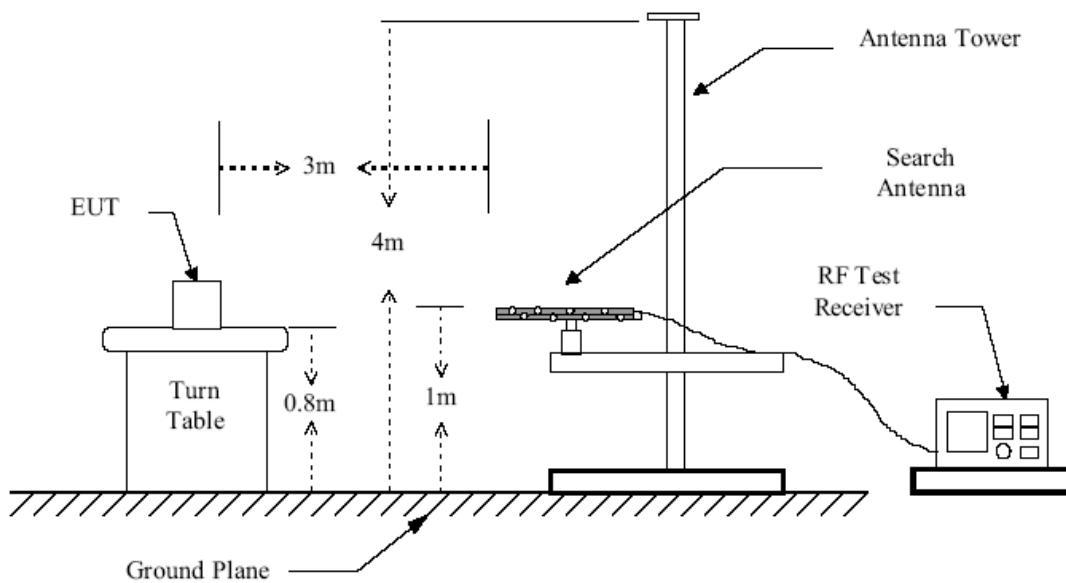
10. Test of Band Edges Emission

10.1 Applicable Standard

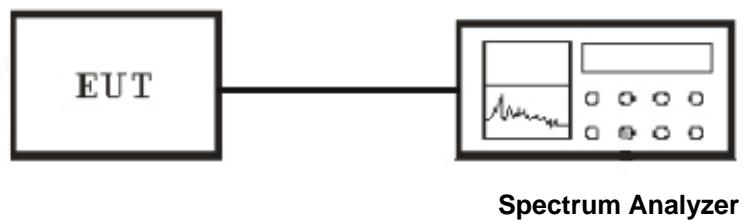
Section 15.247(d): In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. In addition, radiated emissions that fall in the restricted bands, as defined in Section 15.205, must also comply with the radiated emission limits specified in Section 15.209.

10.2 EUT Setup

Radiated Measurement Setup



Conducted Measurement Setup



10.3 Test Equipment List and Details

See section 2.4.

10.4 Test Procedure

Conducted Measurement

1. The transmitter is set to the lowest channel.
2. The transmitter output was connected to the spectrum analyzer via a cable and cable loss is used as the offset of the spectrum analyzer.
3. Set both RBW and VBW of spectrum analyzer to 100KHz with convenient frequency span including 100MHz bandwidth from lower band edge. Then detector set to peak and max hold this trace.
4. The lowest band edges emission was measured and recorded.
5. The transmitter set to the highest channel and repeated 2~4.

Radiated Measurement

1. Configure the EUT according to ANSI C63.4-2009
2. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emission field strength of both horizontal and vertical polarization.
4. For band edge emission, the antenna tower was scan (from 1 M to 4 M) and then the turn table was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. For band edge emission, use 1MHz VBW and 1MHz RBW for reading under AV and use 1MHz VBW and 1MHz RBW for reading under PK.

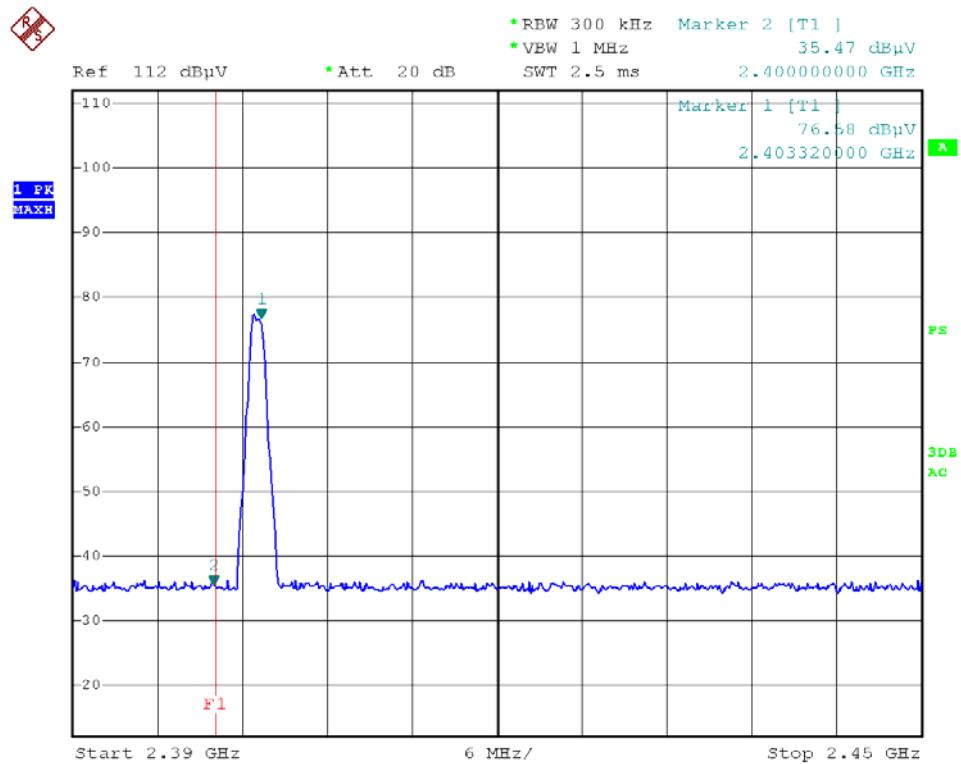
10.5 Test Result

Temperature (°C) : 22~23	EUT: Car Media Player
Humidity (%RH) : 50~54	M/N: G2216
Barometric Pressure (mbar) : 950~1000	Operation Condition: Tx Mode

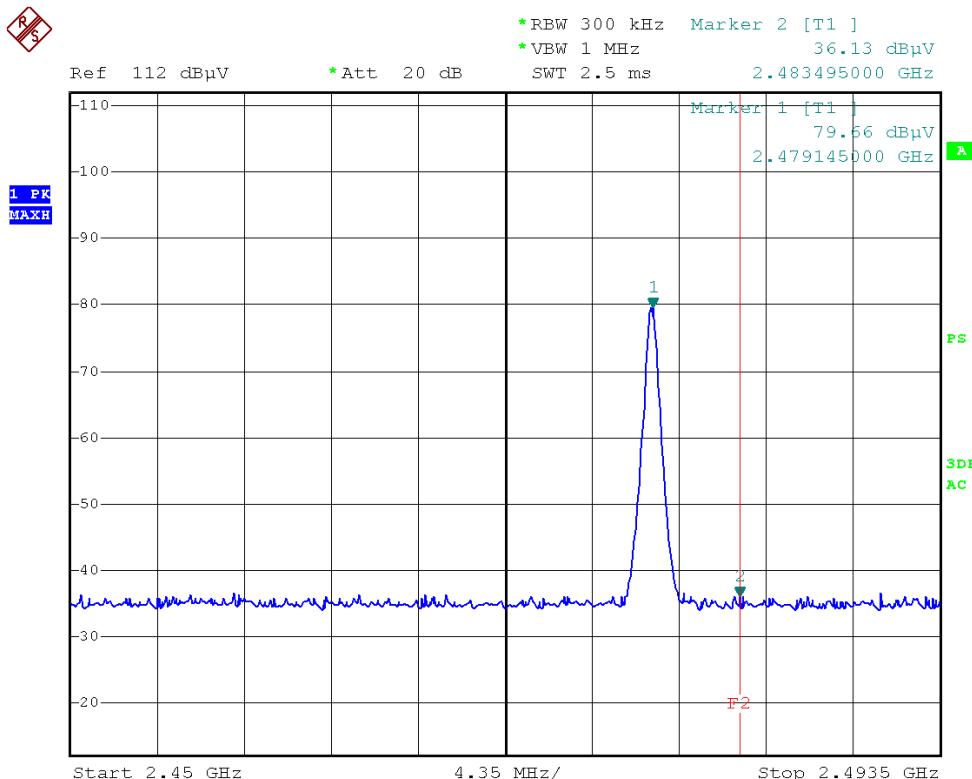
Radiated Test Result

Frequency(MHz)
<2400
>2483.5

The worst frequency range of Low Channel



The worst frequency range of High Channel



11. Test of Spurious Radiated Emission

11.1 Applicable Standard

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. In addition, radiated emissions that fall in the restricted bands, as defined in Section 15.205, must also comply with the radiated emission limits specified in Section 15.209.

11.2 EUT Setup

Radiated Measurement Setup

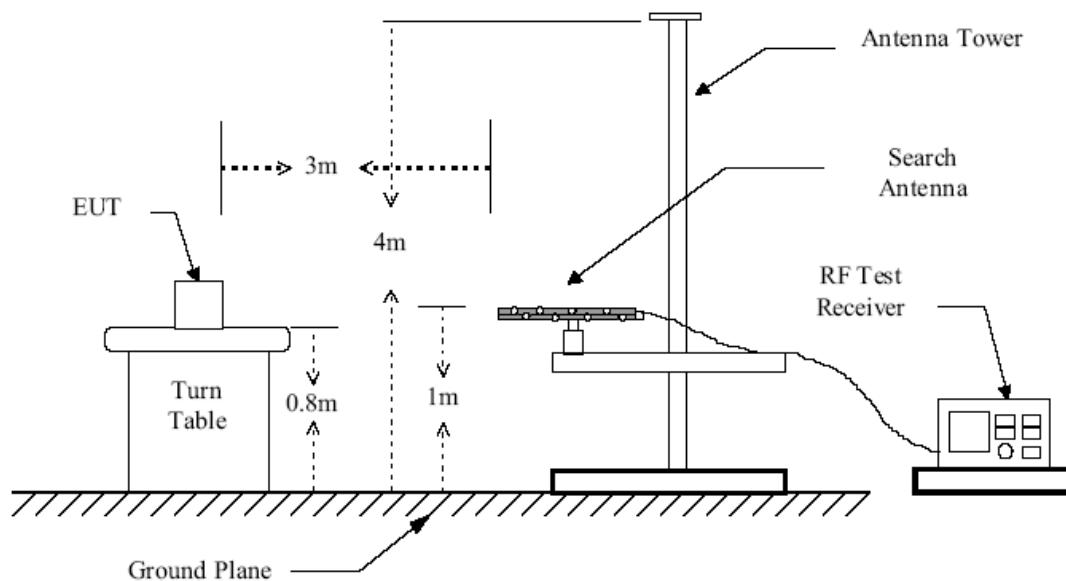


Figure 1 : Frequencies measured below 1 GHz configuration

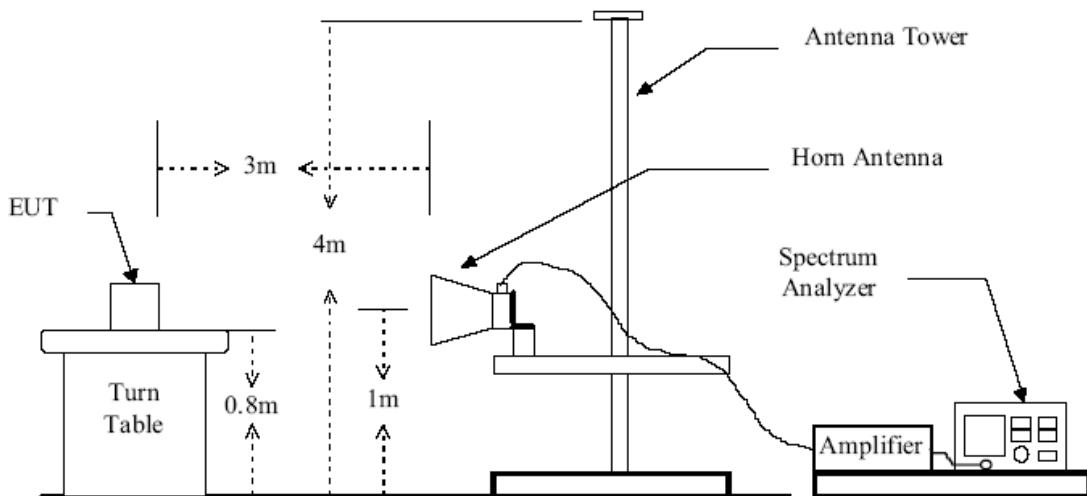
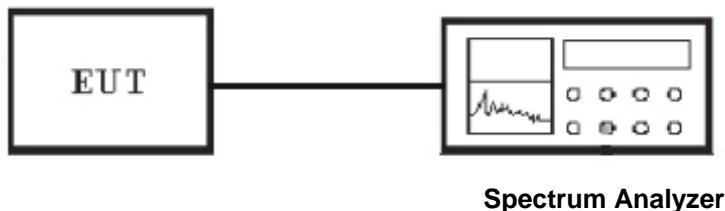


Figure 2 : Frequencies measured above 1 GHz configuration

Conducted Measurement Setup



11.3 Test Equipment List and Details

See section 2.4.

11.4 Test Procedure

Radiated Measurement

1. Configure the EUT according to ANSI C63.4-2009
2. The EUT was placed on the top of the turntable 0.8 meter above ground.
3. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
4. Power on the EUT and all the supporting units.
5. The turntable was rotated by 360 degrees to determine the position of the highest radiation.

6. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emission field strength of both horizontal and vertical polarization.
7. For each suspected emission, the antenna tower was scanned (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
8. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.

Conducted Measurement

1. For emission above 1GHz, conducted measurement method is used.
2. The transmitter is set to the lowest channel.
3. The transmitter output was connected to the spectrum analyzer via a cable and cable loss is used as the offset of the spectrum analyzer.
4. Set RBW to 1 MHz and VBW to 3 MHz, Then detector set to peak and max hold this trace.
5. The lowest band edges emission was measured and recorded.
6. The transmitter set to the highest channel and repeated 2~4.

11.5 Test Result

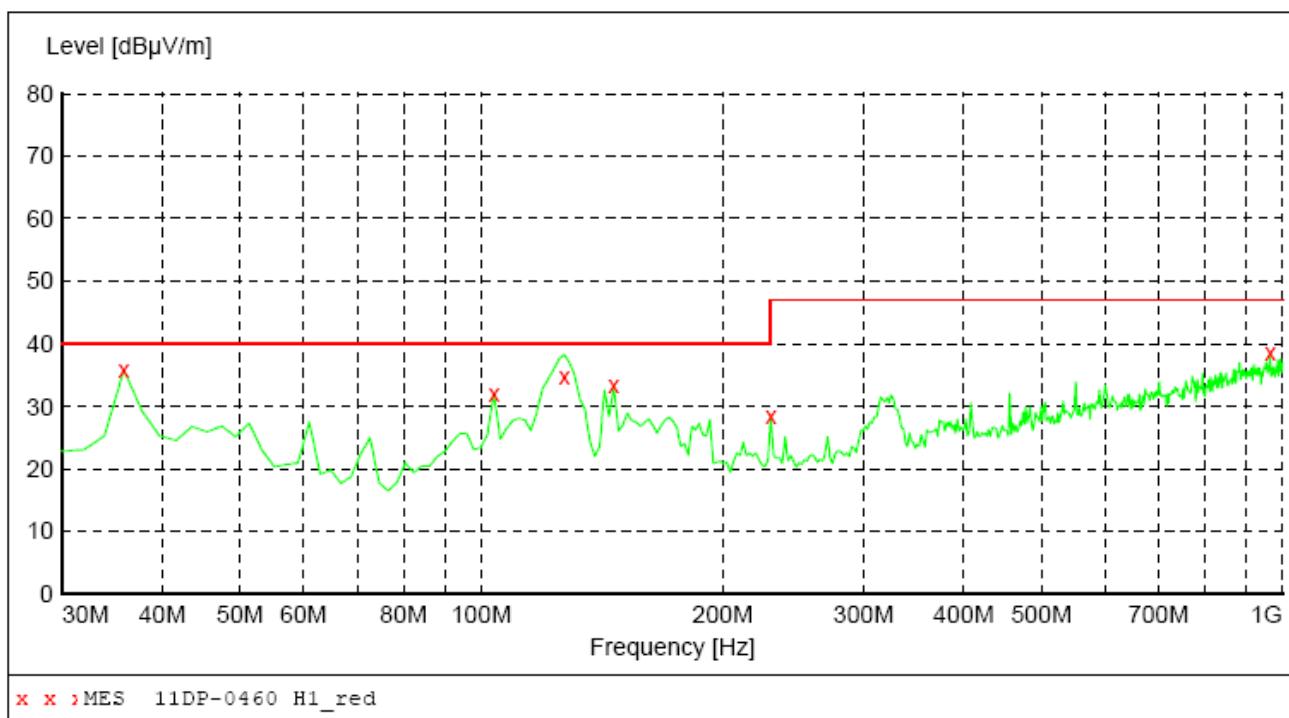
Temperature (°C) : 22~23	EUT: Car Media Player
Humidity (%RH) : 50~54	M/N: G2216
Barometric Pressure (mbar) : 950~1000	Operation Condition: Normal operation

Spurious Emission (30~1000MHz)

EUT: Car Media Player
 M/N: G2216
 Operating Condition: Normal Operation
 Test Site: 3m CHAMBER
 Operator: Chen
 Test Specification: DC 13.8V
 Comment: Polarization: Horizontal
 Tem:25°C Hum:50%

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

Short Description:			Field Strength		
Start Frequency	Stop Frequency	Detector	Meas.	IF	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	VULB9163 NEW



MEASUREMENT RESULT: "11DP-0460 H1_red"

4/13/2011 20:45

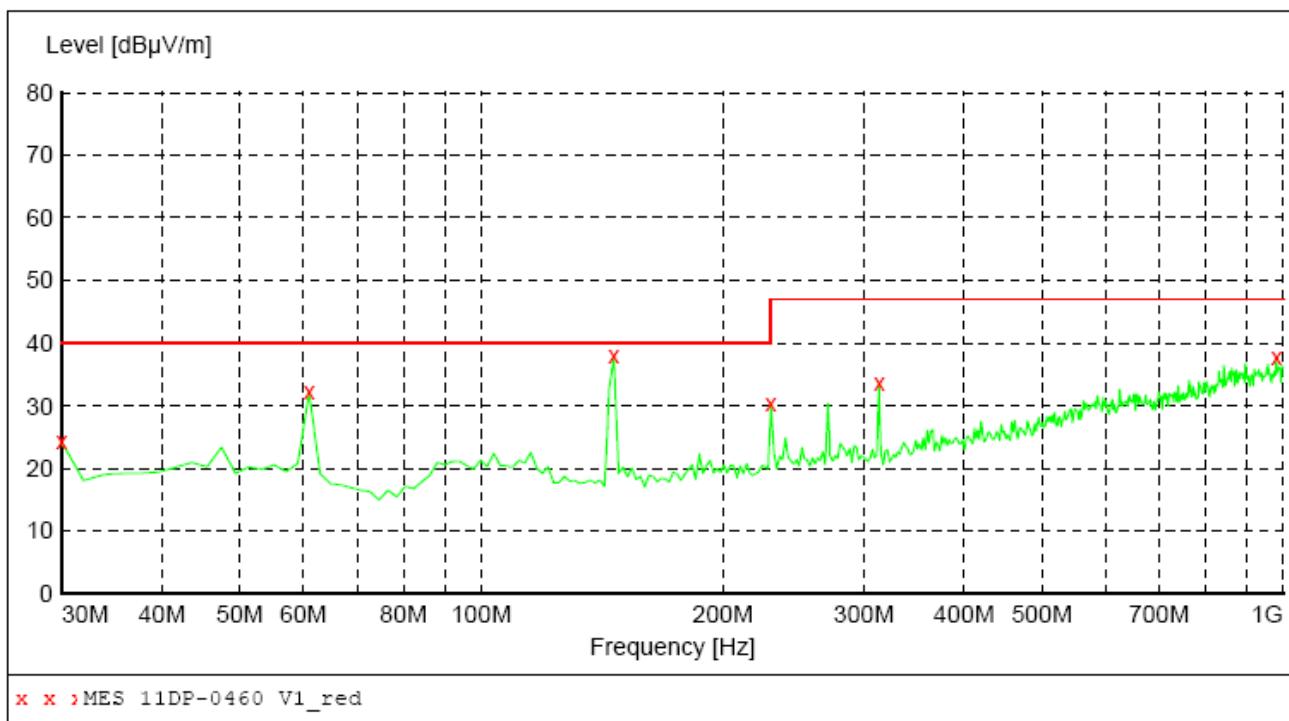
Frequency MHz	Level dB μ V/m	Transd dB	Limit dB μ V/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
35.820000	35.80	14.7	40.0	4.2	QP	100.0	0.00	HORIZONTAL
103.720000	32.10	17.2	40.0	7.9	QP	300.0	0.00	HORIZONTAL
127.000000	35.30	14.1	40.0	4.7	QP	100.0	0.00	HORIZONTAL
146.400000	33.30	13.2	40.0	6.7	QP	100.0	0.00	HORIZONTAL
229.820000	28.60	16.6	40.0	11.4	QP	100.0	0.00	HORIZONTAL
965.080000	38.50	31.9	47.0	8.5	QP	100.0	0.00	HORIZONTAL

Spurious Emission (30~1000MHz)

EUT: Car Media Player
 M/N: G2216
 Operating Condition: Normal Operation
 Test Site: 3m CHAMBER
 Operator: Chen
 Test Specification: DC 13.8V
 Comment: Polarization: Vertical
 Tem:25°C Hum:50%

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

Short Description:			Field Strength		
Start Frequency	Stop Frequency	Detector	Meas.	IF	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	VULB9163 NEW



MEASUREMENT RESULT: "11DP-0460 V1_red"

4/13/2011 20:47

Frequency MHz	Level dB μ V/m	Transd dB	Limit dB μ V/m	Margin dB	Det. QP	Height cm	Azimuth deg	Polarization
30.000000	24.20	14.3	40.0	15.8	QP	100.0	0.00	VERTICAL
61.040000	32.20	14.2	40.0	7.8	QP	100.0	0.00	VERTICAL
146.400000	38.00	13.2	40.0	2.0	QP	100.0	0.00	VERTICAL
229.820000	30.50	16.6	40.0	9.5	QP	100.0	0.00	VERTICAL
313.240000	33.60	19.0	47.0	13.4	QP	100.0	0.00	VERTICAL
980.600000	37.70	32.1	47.0	9.3	QP	100.0	0.00	VERTICAL

Spurious Emission test data above 1G

Maximum Frequency (MHz)	Channel Low					Limit (dB μ V/m)	Margin (dB μ V/m)	Mark (P/Q/A)			
	Polarity and Level				Result dB μ V/m						
	Polarity	Height (m)	Reading dB μ V	Transd							
2390.00	H	1.00	30.1	24.3	54.4	74.0	19.6	P			
			22.3	24.3	45.6	54.0	7.4	A			
2390.00	V	1.00	32.8	24.3	57.1	74.0	16.9	P			
			24.1	25.2	49.3	54.0	3.7	A			
2402.01	H	1.00	68.7	24.3	93.1	114	20.9	P			
			67.0	24.3	91.3	94	2.7	A			
2402.01	V	1.00	68.6	24.8	93.4	114	20.6	P			
			65.4	24.8	90.2	94	3.9	A			
4804.03	H	1.00	21.7	24.3	46.0	74.0	28.0	P			
			17.8	24.3	42.1	54.0	11.9	A			
4804.03	V	1.00	25.0	24.3	49.3	74.0	24.7	P			
			11.6	24.3	45.9	54.0	8.1	A			
7206.05	H	1.00	24.0	24.8	48.8	74.0	25.2	P			
			20.3	24.8	45.1	54.0	8.9	A			
7206.05	V	1.00	25.2	24.8	50	74.0	24.0	P			
			21.7	24.8	46.5	54.0	7.5	A			
9608.06	H	1.00	22.2	25.1	47.3	74.0	26.7	P			
			16.8	25.1	41.9	54.0	12.1	A			
9608.06	V	1.00	22.3	25.1	47.4	74.0	26.6	P			
			19.1	25.1	44.2	54.0	9.8	A			
12010.07	---	---	---	---	---	---	---				
14412.08	---	---	---	---	---	---	---				
16814.09	---	---	---	---	---	---	---				
19216.11	---	---	---	---	---	---	---				
21618.12	---	---	---	---	---	---	---				
24020.13	---	---	---	---	---	---	---				
Remark: 1. Transd.=Antenna Factor+Cable Loss+Pre-amplifier Margin = Level-Limit Mark: P means Peak Value, Q means Quasi Peak Value, A means Average Value 2. Data of measurement within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured. 3. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz. 4. The test limit distance is 3m limit											

Channel Mid								
Maximum Frequency (MHz)	Polarity and Level					Limit (dB μ V/m)	Margin (dB μ V/m)	Mark (P/Q/A)
	Polarity	Height (m)	Reading dB μ V	Transd	Result dB μ V/m			
2441.02	H	1.00	19.3	24.3	92.3	114	21.7	P
			26.3	24.3	91.9	94	2.1	A
2441.02	V	1.00	22.7	24.8	91.8	114	22.2	P
			18.7	24.8	90.8	94	3.2	A
4882.05	H	1.00	24.2	24.3	48.5	74.0	25.5	P
			19.1	24.3	43.4	54.0	10.6	A
4882.05	V	1.00	24.6	24.3	48.9	74.0	25.1	P
			20.4	24.3	44.7	54.0	9.3	A
7323.07	H	1.00	25.8	24.8	50.6	74.0	23.4	P
			19.3	24.8	44.1	54.0	9.9	A
7323.07	V	1.00	26.3	24.8	51.1	74.0	22.9	P
			22.7	24.8	47.5	54.0	6.5	A
9764.10	H	1.00	18.7	25.0	43.7	74.0	30.3	P
			18.8	25.0	53.8	54.0	10.2	A
9764.10	V	1.00	19.3	25.0	44.3	74.0	29.7	P
			16.9	25.0	41.9	54.0	12.1	A
12205.11	---	---	---	---	---	---	---	---
14646.13	---	---	---	---	---	---	---	---
17087.14	---	---	---	---	---	---	---	---
19528.16	---	---	---	---	---	---	---	---
21969.20	---	---	---	---	---	---	---	---
24410.21	---	---	---	---	---	---	---	---
Remark: <ol style="list-style-type: none"> 1. Transd.=Antenna Factor+Cable Loss+Pre-amplifier Margin = Level-Limit Mark: P means Peak Value, Q means Quasi Peak Value, A means Average Value 2. Data of measurement within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured. 3. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz. 4. The test limit distance is 3m limit 								

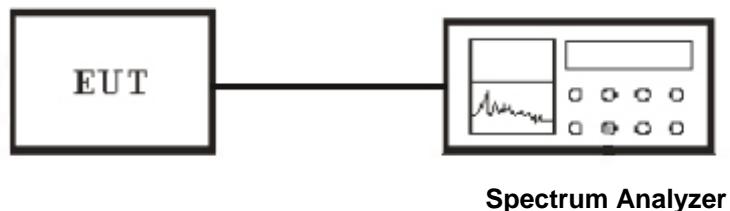
Channel High								
Maximum Frequency (MHz)	Polarity and Level					Limit (dB μ V/m)	Margin (dB μ V/m)	Mark (P/Q/A)
	Polarity	Height (m)	Reading dB μ V	Transd	Result dB μ V/m			
2.480.01	H	1.00	25.1	24.8	88.5	114	25.5	P
			21.5	24.8	87.9	94	6.1	A
2.480.01	V	1.00	20.3	25.1	92.3	114	21.7	P
			25.2	25.1	91.5	94	2.5	A
2500.00	H	1.00	29.3	24.3	53.6	74.0	20.4	P
			23.7	24.3	48.0	54.0	6.0	A
2500.00	V	1.00	33.5	24.3	58.8	74.0	15.2	P
			24.3	25.2	49.5	54.0	3.5	A
4960.02	H	1.00	25.2	24.0	49.2	74.0	24.8	P
			21.8	24.0	45.8	54.0	8.2	A
4960.02	V	1.00	25.7	24.0	49.7	74.0	24.3	P
			22.9	24.0	46.9	54.0	7.1	A
7440.03	H	1.00	25.4	25.2	50.6	74.0	23.4	P
			18.9	25.2	44.1	54.0	9.9	A
7440.03	V	1.00	27.1	25.2	52.3	74.0	21.7	P
			21.5	24.9	46.4	54.0	7.6	A
9920.04	H	1.00	18.5	24.9	43.4	74.0	30.6	P
			16.4	24.9	41.3	54.0	12.7	A
9920.04	V	1.00	22.4	24.9	47.3	74.0	26.7	P
			19.9	24.9	44.8	54.0	9.2	A
12400.05	---	---	---	---	---	---	---	
14880.06	---	---	---	---	---	---	---	
17360.07	---	---	---	---	---	---	---	
19840.08	---	---	---	---	---	---	---	
22320.09	---	---	---	---	---	---	---	
24800.10	---	---	---	---	---	---	---	
Remark: 1. Transd.=Antenna Factor+Cable Loss+Pre-amplifier Margin = Level-Limit Mark: P means Peak Value, Q means Quasi Peak Value, A means Average Value 2. Data of measurement within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured. 3. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz. 4. The test limit distance is 3m limit								

12. Test of Peak Power Spectral Density

12.1 Applicable Standard

According to § 15.247(d), for direct sequence systems, the peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3kHz band during any time interval of continuous transmission.

12.2 EUT Setup



12.3 Test Equipment List and Details

See section 2.4.

12.4 Test Procedure

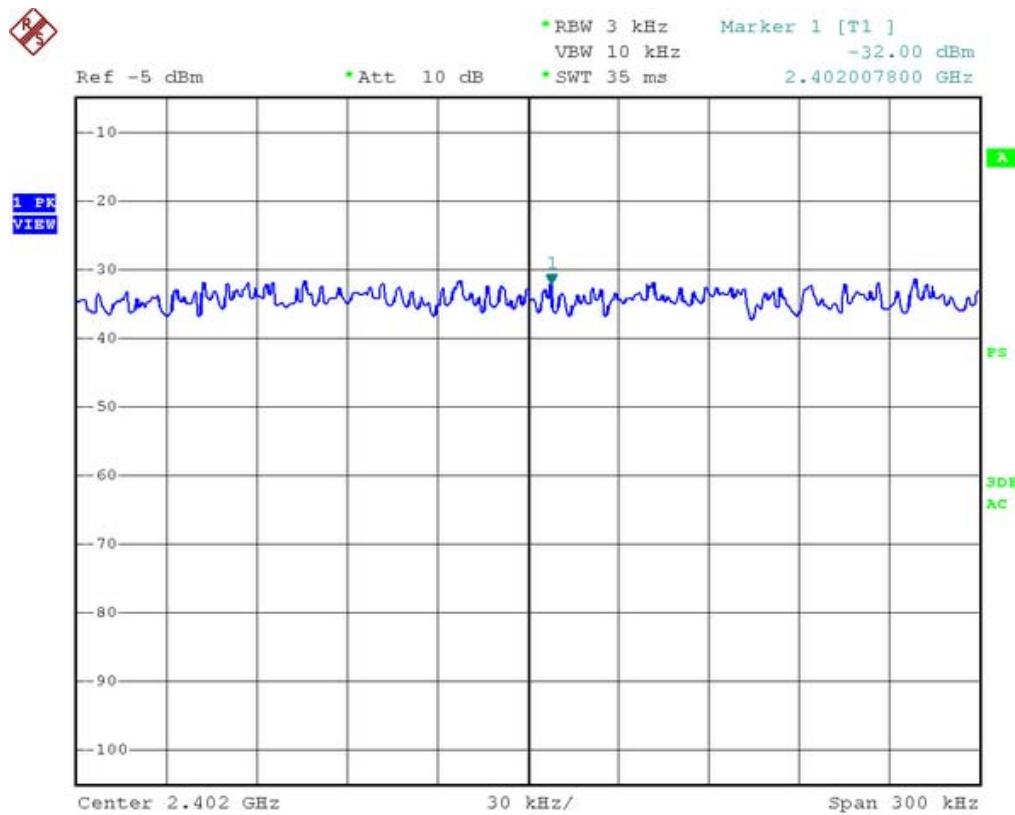
1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as RBW = 3KHz, VBW = 10KHz, Span = 300KHz, Sweep=100s
4. Record the max. reading.
5. Repeat above procedures until all frequency measured were complete.

12.5 Test Result

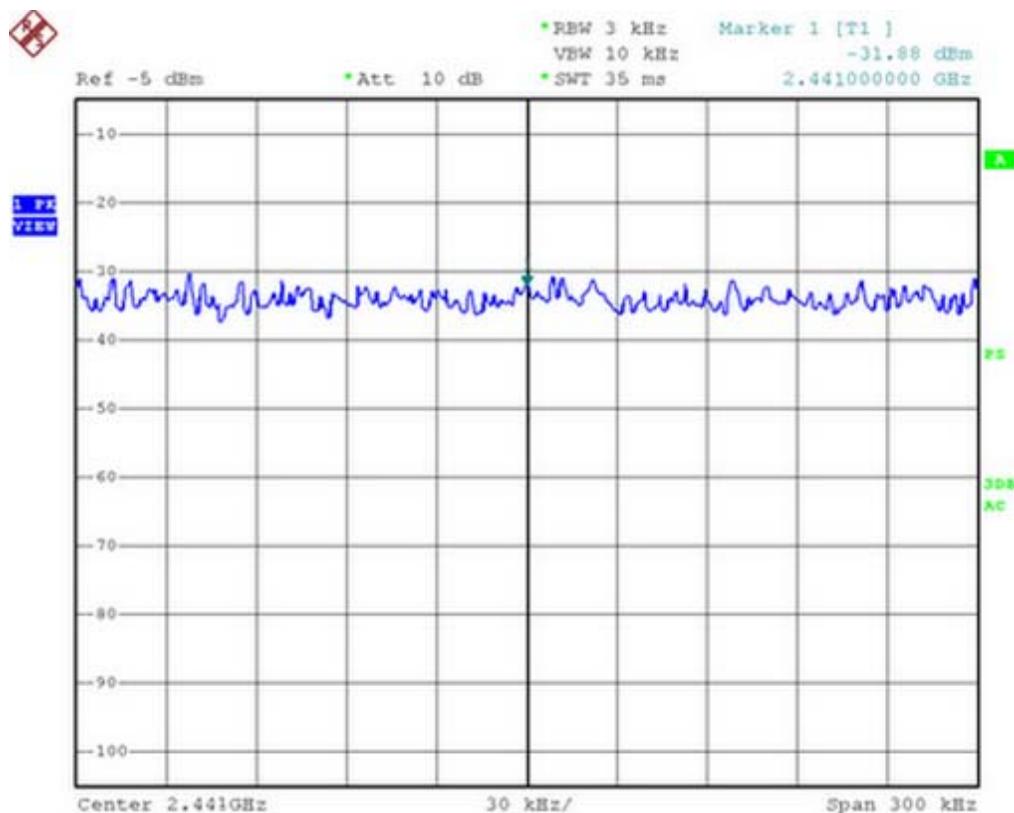
Temperature (°C) : 22~23	EUT: Car Media Player
Humidity (%RH) : 50~54	M/N: G2216
Barometric Pressure (mbar) : 950~1000	Operation Condition: Tx Mode

CH	RF Power Density Reading (dBm)	Cable loss (dB)	RF Power Density Level (dBm)	Maximum Limit (dBm)
Low	-32.00	1.20	-30.80	8
Mid	-31.88	1.20	-30.68	8
High	-32.09	1.20	-30.89	8

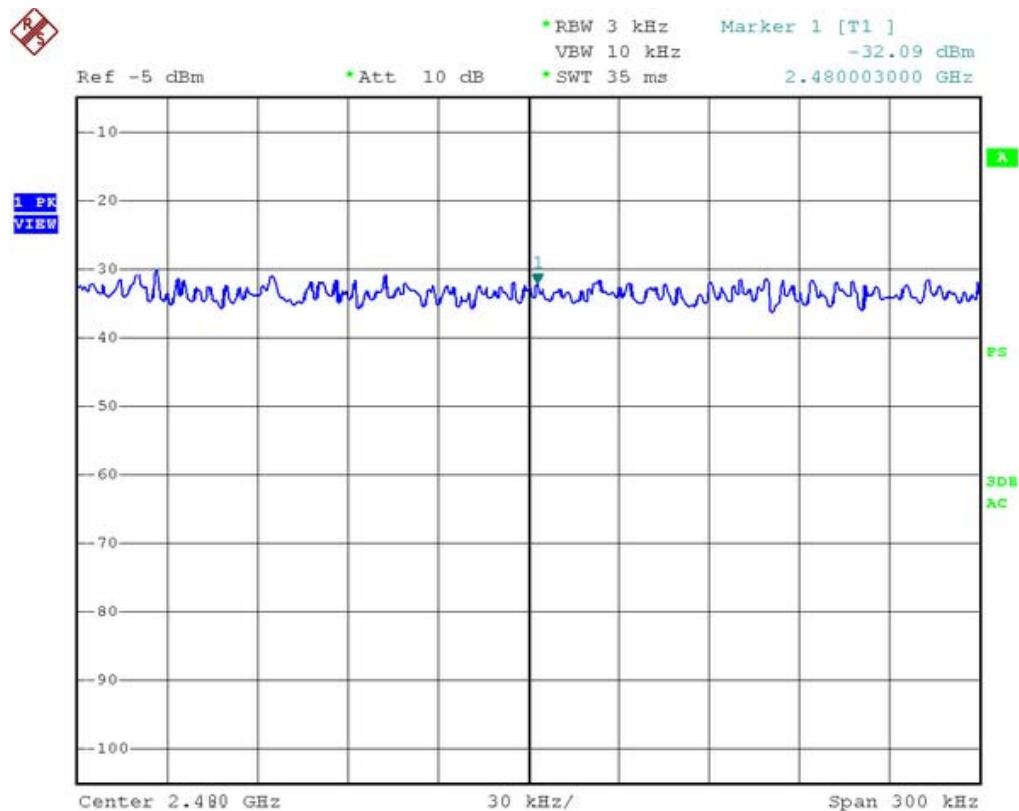
Channel Low :



Channel Mid :



Channel High :



13. ANTENNA REQUIREMENT

13.1 Standard Applicable

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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

Section 15.247(b)/(c):

If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

If the intentional radiator is used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum peak output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

13.2 Antenna Connected Construction

The antenna connector is designed with permanent attachment and no consideration of replacement.