



CERTIFICATION TEST REPORT

FCC CFR47 PART 15 SUBPART C

Test Report File No.	12-IST-0537	<input checked="" type="checkbox"/> Basic	<input type="checkbox"/> Alternate
Date of Receipt	August 16, 2012	Begin of test date	August 21, 2012
Date of Issue	September 04, 2012	End of test date	August 30, 2012

Kind of Product	Handle Remote Controller
Basic Model(s)	RH-750
FCC ID	ZBTRH-750

Applicant	MONEUAL INC.
Address	1501, 15 th FL. Partners Tower I, 83, Gasandigital1-ro, Geumcheon-gu, Seoul, Korea
Manufacturer	MONEUAL INC.
Address	1501, 15 th FL. Partners Tower I, 83, Gasandigital1-ro, Geumcheon-gu, Seoul, Korea

Test Result

Positive

Negative

Tested By

B.O.KO

Reviewed By

S.J.CHO

Comment(s)

- Investigations requested : Measurement to the relevant clauses of FCC rules and regulations Part 15 Subpart C
- The test report is consists of 28 pages
- The test result only responds to the tested sample.
- It is not allowed to copy this report even partly without the allowance of IST Co., Ltd.
- This equipment as for has been shown to be capable of continued compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.4
- I assume full responsibility for accuracy and completeness of these data.



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INFORMATION OF TEST LABORATORY

IST Co., Ltd.

400-19, Singal-dong, Giheung-gu, Yongin-si,

Gyeonggi-do, 446-599, Korea

TEL : +82 31 326 6700 FAX : +82 31 326 6797

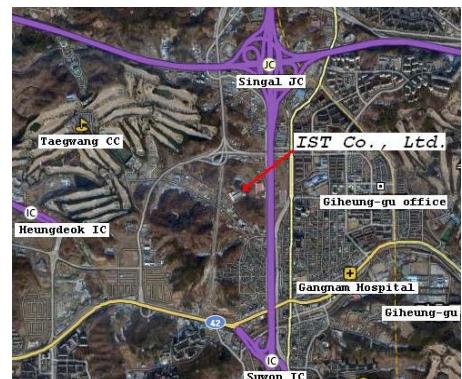
KOLAS Testing No. : 118

RRA Designation No. : KR0018

FCC Registration No. : 400603

FCC(DoC) Registration No. : 801060

VCCI Member No. : 1739



Description of the Equipment under Test

Handle Remote Controller

Model	RH-750
Dimension	L 199mm x W 120mm x H 58mm
Weight	About 115g (Without battery)
Power Consumption	About 70mW
Power Supply	DC 3 V(AA alkaline batteries (LR6) 2EA)
Radio Frequency	2.4GHz ISM BAND
Signal Transmission Distance (RF)	About 10meters (variable depending on environment)
Sensor	3-axis acceleration sensor, 3-axis gyroscope
Motion recognition	Embedded digital motion processor
Specification(s)	FCC CFR47 PART 15 SUBPART C
Number of Channel	11(2403~2479MHz)

Note: All the testing were performed according to the procedures in

FCC CFR47 PART 15 SUBPART C



Measurement Uncertainty Calculations

The measurement uncertainties stated were calculated in accordance with the requirements of NIST Technical Note 1297 and NIS 81 (1994).

TYPE	Contribution	Probability Distribution	Uncertainty	Remark
B	AMN Impedance Voltage Division Factor Attenuation : AMN to Receiver	Triangular normal (k=2) normal (k=2)	+2.6/-2.7 dB ±0.2 ±0.1	CISPR
	Receiver(ESCI(S/N:100374)) Sine-Wave Voltage Accuracy Pulse Amplitude Response Pulse Repetition Rate Response	normal (k=2) Rectangular Rectangular	±1.0 dB ±1.5 dB ±1.5 dB	CISPR
	Mismatch AMN to Receiver	U-Shaped	+0.7/-0.8 dB	CISPR
	Reading	normal (k=1)	±0.1	
	Combined Standard Uncertainty	normal	± 1.8 dB	
	Expanded Uncertainty U	normal (k=2)	± 3.6 dB	95 %

$$U = -3.70 / +3.42 \text{ (k=2, 95.45% confidence level)}$$

TYPE	Contribution	Probability Distribution	Uncertainty	Remark
B	Antenna AF factor AF frequency interpolation AF height deviations directivity difference phase center location(3 m) phase center location(10 m)	Normal (k=2) Rectangular Rectangular Rectangular Rectangular	±0.56 ±0.30 dB ±0.50 dB ±0.30 dB +1.0/-0.0 dB ±1.0 dB ±0.30 dB	CAL. CISPR CISPR CISPR CISPR
	Receiver Sine Wave Voltage Accuracy Pulse Amplitude Sensibility Pulse Frequency Response Random Noise	Normal (k=2) Normal (k=2) Normal (k=2) Normal (k=2)	±0.20 dB ±0.40 dB ±0.57 dB ±0.35 dB	CAL. CAL. CAL. CAL.
	Mismatch : Antenna - receiver	U-Shaped	+0.9/-1.0 dB	CISPR
	Table height	Normal (k=2)	±0.01 dB	CISPR
	Separation distance(3 m) Separation distance(10 m)	Rectangular	±0.30 dB ±0.10 dB	CISPR
	Combined standard Uncertainty	Normal	± 1.13	
	Expanded Uncertainty U	Normal (k=2)	± 2.26 dB	95 %

$$U = ±2.26 \text{ (k=2, 95% confidence level)}$$



SUMMARY

(2403 MHz ~ 2479 MHz)

Applied Standard : FCC CRF Part 15 Subpart C

Standard Section	Description	result	remark
15.207	AC Conducted Emission	N/A	Operating by Battery Power (AA Size)
15.209	Field Strength of Harmonics	Pass	Meet the requirements
15.247(b)	Peak Power Output	Pass	Meet the requirements
15.247(d)	Conducted Band Edges	Pass	Meet the requirements
	Conducted Spurious Emission	Pass	Meet the requirements
	Radiated Band Edges	Pass	Meet the requirements
	Radiated Spurious Emission	Pass	Meet the requirements
15.247(a)(2)	6dB Bandwidth	Pass	Meet the requirements
15.247(e)	Power Spectral Density	Pass	Meet the requirements
15.203 & 15.247(b)	Antenna requirement	-	Meet the requirements

Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the Following standards:

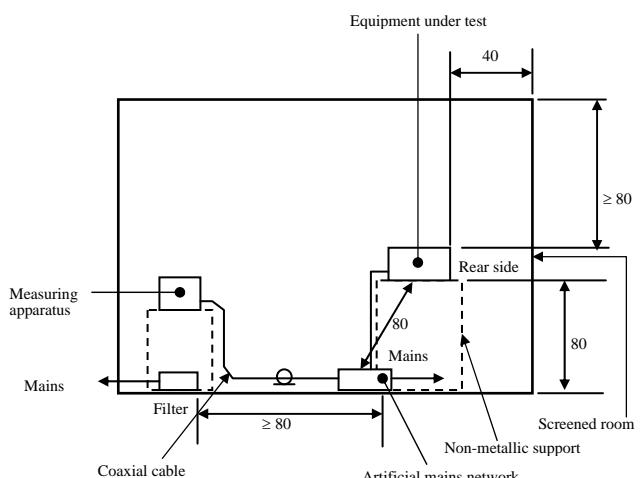
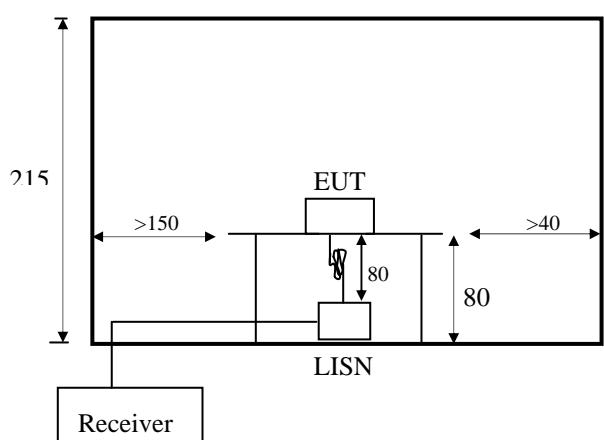
- ❖ FCC Part 15 Subpart C § 15.247
- ❖ FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v01
- ❖ FCC TCB Workshop 2012, April
- ❖ ANSI C63.4-2003 and ANSI C63.10-2009

Conducted Emissions:

The measurement were performed over the frequency range of 0.15 MHz to 30 MHz using a $50 \Omega/50 \mu\text{H}$ LISN as the input transducer to a Spectrum Analyzer or a Field Intensity Meter. The measurements were made with the detector set for "Peak" amplitude within a bandwidth of 10 kHz or for "quasi-peak" & "Average" within a bandwidth of 9 KHz.

- Procedure of Test

The line-conducted facility is located inside a shielded room No.1. A 1 m X 1.5 m wooden table 80 cm height is placed 40 cm away from the vertical wall and 1.5 m away from the other wall of the shielded room. The R/S ESCI and Hyup-Rip KNW-407 LISN are bonded to bottom of the shielded room. The EUT is located on the wooden table with distance more than 80 cm from the LISN and powered from the EMC LISN. The peripheral equipment is powered from the other LISN. Power to the LISNs are filtered by a noise cut power line filters. All electrical cables are shielded by braided tinned steel tubing with inner ϕ 1.2 cm. If the EUT is a DC-powered device, power will be derived from the source power supply it normally will be powered from and this supply lines will be connected to the EMC LISN. All interconnecting cables more than 1m were shortened by non-inductive bundling to a 1m length. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating conditions. The RF output of the LISN was connected to the R/S receiver to determine the frequency producing the maximum emission from the EUT. The frequency producing the maximum level was reexamined using Quasi-Peak mode by manual measurement, after scanned by automatic Peak mode for frequency range from 0.15 to 30 MHz. The bandwidth of the receiver was set to 10 kHz. The EUT, peripheral equipment, and interconnecting cables were arranged and manipulated to maximize each EME emission.



< Side View >

< Concept Drawing >



Limits

According to §15.207(a) except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (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 the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network(LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency Range (MHz)	Limits	
	Quasi-peak	Average
0.15 to 0.50	66 to 56*	56 to 46*
0.50 to 5	56	46
5 to 30	60	50

* Decreases with the logarithm of the frequency.

Test specification.

According to FCC CFR Title 47 Part 15 Subpart C Section 15.207



Conducted Emissions

[Not Applicable]

◆ Test Equipment Used

Model Name	Description	Manufacturer	Calibration Date	Serial No.
ESCI	Test Receiver	Rohde & Schwarz	Jul. 16, 2012	100373
KNW-407	LISN	Hyup-Rip	Oct. 10, 2011	8-833-10
ESH3-Z2	Pulse Limiter	Rohde & Schwarz	May. 10, 2012	357.8810.52

◆ Test Accessories Used

◆ Test Conditions

◆ Test Date

◆ Test Area

Note : The equipment used is calibrated in regular for every year.



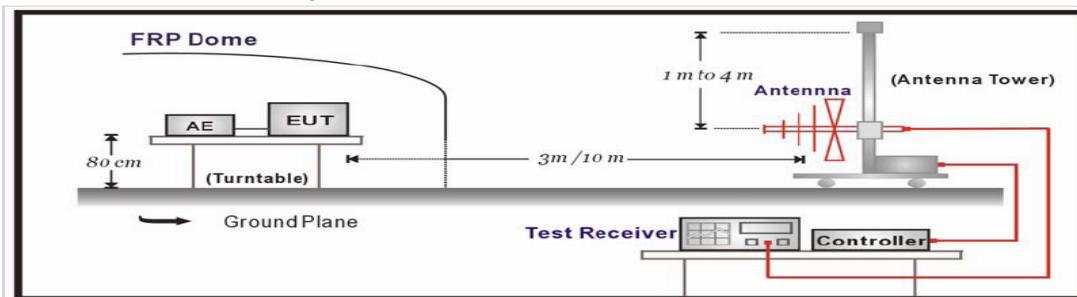
Radiated Emissions:

The measurement was performed over the frequency range of 30MHz to 1GHz using antenna as the input transducer to a Spectrum analyzer or a Field Intensity Meter. The measurement was made with the detector set for "quasi-peak" within a bandwidth of 120kHz.

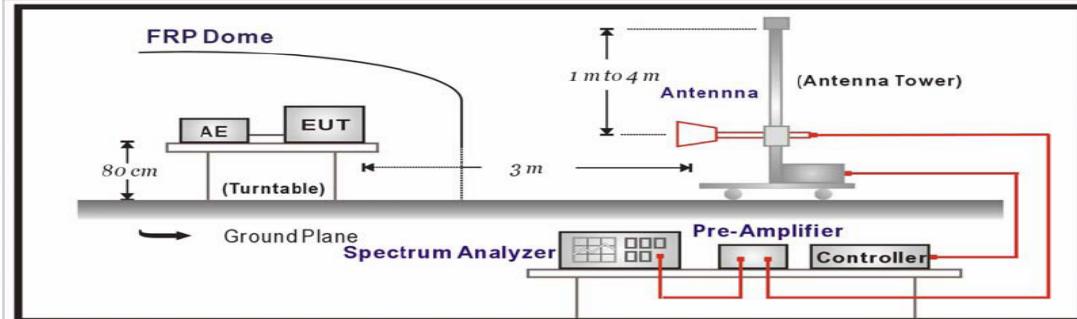
Procedure of Test

Preliminary measurements were made at 3 meter using bi-log antennas, and spectrum analyzer to determine the frequency producing the max. emission in anechoic chamber. Appropriate precaution was taken to ensure that all emission from the EUT were maximized and investigated. The system configuration, mode of operation, turn-table azimuth and height with respect to the antenna were noted for each frequency found. The spectrum was scanned from 30MHz to 1000MHz using bi-log antenna. Above 1GHz, linearly polarized double ridge horn antennas were used. Final measurements were made at open site with 3-meters test distance using bi-log antenna or horn antenna. The OATS have been verified in regular for its normalized site attenuation. The test equipment was placed on a wooden table. Sufficient time for the EUT, peripheral equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. Each frequency found during pre-scan measurements was re-examined by manual. The detector function was set to CISPR quasi-peak mode and the bandwidth of the receiver was set to 120kHz or 1MHz depending on the frequency of type of signal. The EUT, peripheral equipment and interconnecting cables were re-configured to the set-up producing the max. emission for the frequency and were placed on top of a 0.8-meter high nonmetallic 1 x 1.5 meter table. The EUT, peripheral equipment, and interconnecting cables were re-arranged and manipulated to maximize each emission. The turntable containing the system was rotated; the antenna height was varied 1 to 4 meters and stopped at the azimuth or height producing the maximum emission. Each emission was maximized by: varying the mode of operation to the EUT and/or peripheral equipment and changing the polarity of the antenna, whichever determined the worst-case emission. (The bandwidth below 1GHz setting on the field strength meter is 120KHz and above 1GHz is 1MHz.)

Under 1GHz Test Setup:

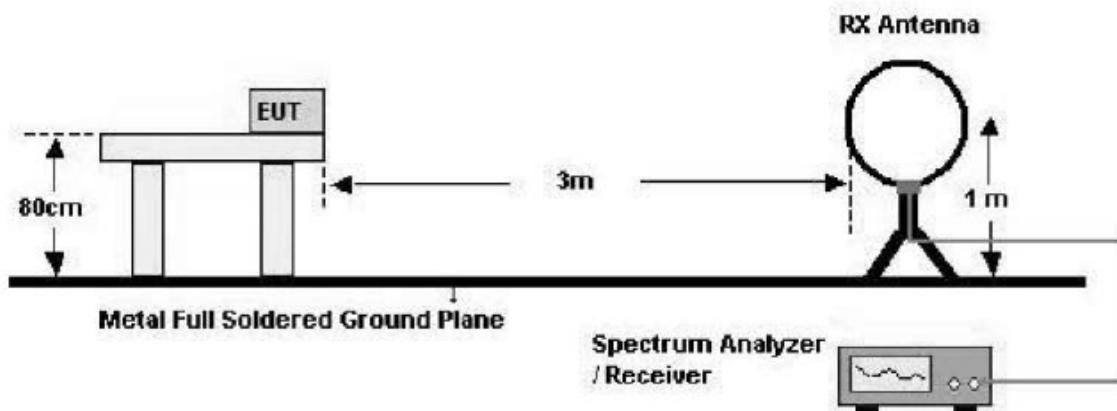


Above 1GHz Test Setup:





Below 30 MHz



Limits

Emissions radiated outside of the specified frequency bands, except for harmonics, Shall be attenuated by at least 20dB below the level of the fundamental or to the General radiated emission limits in paragraph 15.209, whichever is the lesser attenuation:

FCC Part 15 Subpart C Section 15.209 Limits		
Frequency (MHz)	$\mu\text{V}/\text{meter}$	$\text{dB}\mu\text{V}/\text{meter} (3\text{m})$
0.009-0.490	2400/F(KHz) at 300 m	20log 2400/F(KHz)+80
0.490-1.705	24000/F(KHz) at 30m	20log 24000/F(KHz)+40
1.705-30	30 at 30 m	49.5
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

Remarks :

1. RF Voltage(dBuV)=20log RF Voltage(uV)
2. $\text{dBuV}/\text{m} = \text{ERP}(\text{dBm})+106.92 \text{ dB} + 20\log(10\text{m}/3\text{m}) + 2.15\text{dB}$ (conversion Factor for E.I.R.P)
3. In the Above Table, the tighter limit applies at the band edges.
4. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

Test specification.

According to FCC CFR Title 47 Part 15 Subpart C Section 15.209



Radiated Spurious Emission

[Applicable]

◆ Test Equipment Used

Name	Type	Manufacturer	Calibration. Date	Serial Number
ESCS30	EMI Receiver	Rohde & Schwarz	May. 10, 2012	100171
ESCI7	EMI Receiver	Rohde & Schwarz	July. 16, 2013	100872
SPECTRUM ANALYZER	R3273	ADVANTEST	May. 10, 2012	110600587
Loop Antenna	HFH2-ZZ	Rohde & Schwarz	Oct. 29, 2010	8620771017
Log-bicon Antenna	VULB9161SE	Schwarz beck	Nov. 22, 2011	4088
HORN-Antenna	3115	EMCO	Nov. 21, 2011	9012-3602
HORN-Antenna	SAS-571	A.H. SYSTEMS	Nov. 21, 2011	500
PRE AMPLIFIER	8449B OPT H02	Rohde & Schwarz	Oct. 11, 2011	3008A0530

Note : 1. The calibration interval of the above test instruments is 12 months

and the calibrations are traceable to RRL, KRISS, KTL and HCT.

2. The calibration interval of horn ant. and loop ant. is 24 months

Field Strength Calculation

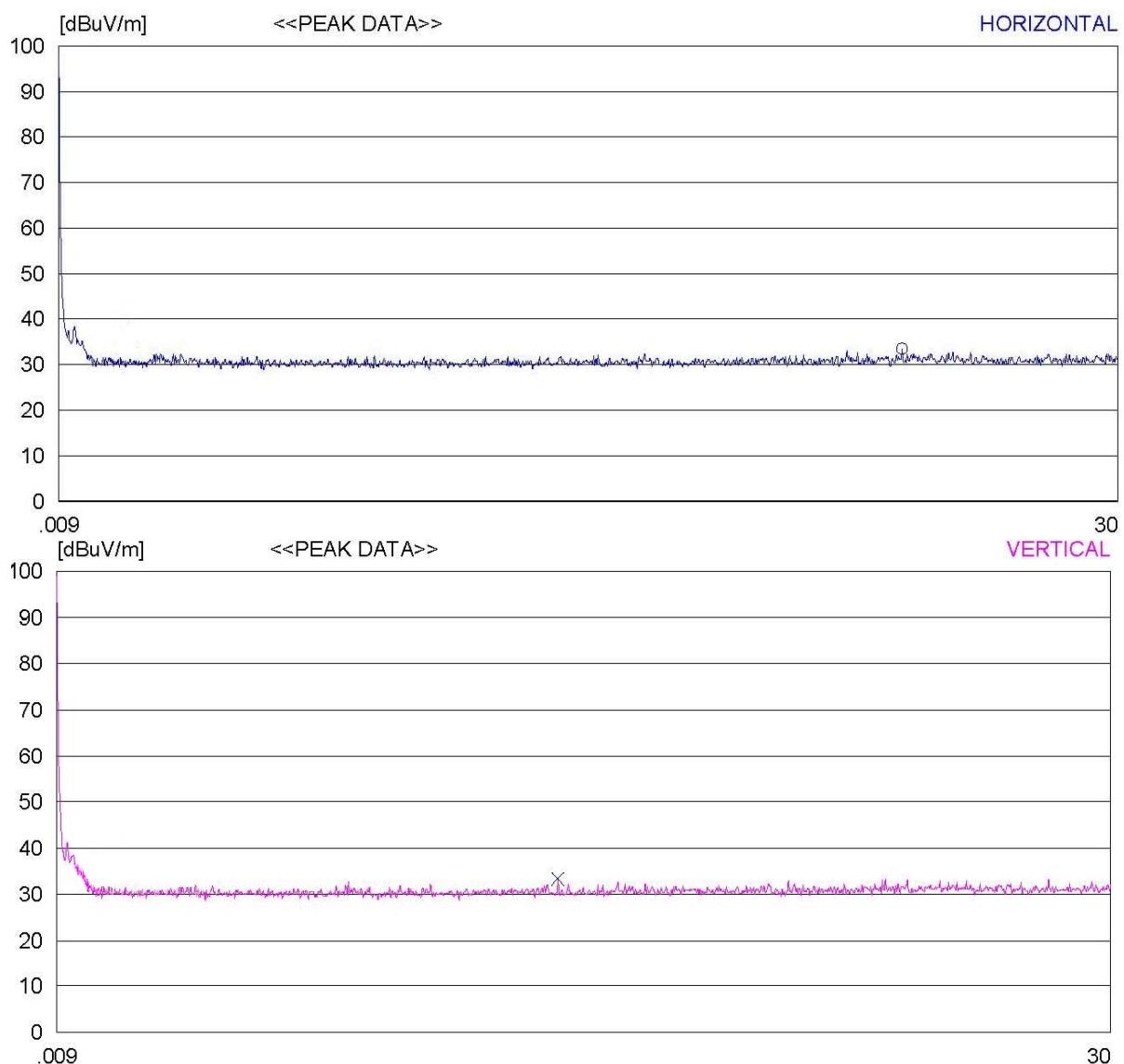
The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. For the limit is employed average value, therefore the peak value can be transferred to average value by subtracting the duty factor. The basic equation with a sample calculation is as follows:

$$\text{Peak} = \text{Reading} + \text{Corrected Factor}$$

Where Corr. Factor = Antenna Factor + Cable Factor - Amplifier Gain (if any)



Test Plot : 9 KHz to 30 MHz



Freq. (MHz)	Reading (dBuV/m)	Ant. Factor (dBuV/m)	Cable Loss (dB)	Pol. (H/V)	Limits (dBuV/m)	Result (dB)	Margin (dB)
23.882	9.10	23.70	0.70	H	49.50	33.50	-16.00
14.285	10.10	22.70	0.50	V	49.50	33.30	-16.20

Note: The level of the radiated emission under 30 MHz is too small to be measured.



Radiated Emission Result

[Applicable]

Spurious Emissions Test (Below 1GHz) :

- Pre-scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, packet types and antenna ports(if EUT with antenna diversity architecture), and X, Y, Z Axis.
- Following channel(s) was(were) selected for the final test as listed below.

EUT Configure mode	Available channel	Tested channel	Modulation	Modulation type	Packet type	Axiz
Transmitter	1 to 11	1, 6, 11	-	GFSK	-	X

EUT	RH-750	PROBE	Below 1 GHz
POWER	DC 3 V(Battery)	NOTE	Operating Mode

Frequency MHz	Reading dBuV	P (H,V)	Ant. Factor dB	Cable Loss dB	Limit dBuV	Total dBuV	Margin dB
43.740	13.90	V	11.63	1.13	40.00	26.66	-13.34
74.730	16.10	H	8.69	1.45	40.00	26.24	-13.76
160.120	13.70	H	13.33	2.13	43.50	29.16	-14.34
327.850	18.10	H	13.56	3.02	46.00	34.68	-11.32
403.460	15.50	V	15.31	3.34	46.00	34.15	-11.85
639.140	14.10	H	19.81	4.47	46.00	38.38	-7.62
*725.450	14.60	H	20.68	4.69	46.00	39.97	-6.03

Note :

1. Remark "*" means that the data is the worst emission level.
2. All reading levels are Quasi-peak value.
3. Measurement level = reading level + correct factor



Spurious Emissions Test (Above 1GHz) :

- Pre-scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, packet types and antenna ports(if EUT with antenna diversity architecture), and X,Y,Z Axis.
- Following channel(s) was(were) selected for the final test as listed below.

EUT Configure mode	Available channel	Tested channel	Modulation	Modulation type	Packet type	Axiz
Transmitter	1 to 11	1, 6, 11	-	GFSK	-	X

EUT	RH-750	PROBE	Above 1 GHz
POWER	DC 3 V(Battery)	NOTE	Low Ch

Test Data

Frequency GHz	Reading dBuV		P	Limit dBuV		Margin dB	
	Peak	AV		Peak	AV	Peak	AV
1.201	47.28	40.25	H	74.00	54.00	26.72	13.75
1.937	46.12	38.96	H	74.00	54.00	27.88	15.04
7.208	54.25	39.24	H	74.00	54.00	19.75	14.76
1.201	46.70	40.74	V	74.00	54.00	27.30	13.26
1.937	45.85	38.57	V	74.00	54.00	28.15	15.43
7.208	54.35	38.78	V	74.00	54.00	19.65	15.22

EUT	RH-750	PROBE	Above 1 GHz
POWER	DC 3 V(Battery)	NOTE	Middle Ch

Test Data

Frequency GHz	Reading dBuV		P	Limit dBuV		Margin dB	
	Peak	AV		Peak	AV	Peak	AV
1.220	47.35	40.64	H	74.00	54.00	26.65	13.36
1.952	46.40	39.42	H	74.00	54.00	27.60	14.58
7.322	54.22	38.76	H	74.00	54.00	19.78	15.24
1.220	46.26	39.68	V	74.00	54.00	27.74	14.32
1.952	45.81	39.65	V	74.00	54.00	28.19	14.35
7.322	53.78	38.50	V	74.00	54.00	20.22	15.50



EUT	RH-750	PROBE	Above 1 GHz
POWER	DC 3 V(Battery)	NOTE	High Ch

Test Data

Frequency GHz	Reading dBuV		P	Limit dBuV		Margin dB	
	Peak	AV		Peak	AV	Peak	AV
1.239	48.05	41.56	H	74.00	54.00	25.95	12.44
1.968	51.48	40.28	H	74.00	54.00	22.52	13.72
7.436	57.85	40.84	H	74.00	54.00	16.15	13.16
1.239	45.84	39.21	V	74.00	54.00	28.16	14.79
1.968	52.58	38.57	V	74.00	54.00	21.42	15.43
7.436	56.94	38.95	V	74.00	54.00	17.06	15.05

Note : Reading(dBuV) : Measurement Level + Ant Factor + Cable Loss - Amp Gain



Peak Power Output

◆ Test Equipment

The following test equipment are used during the test:

Item	Equipment	Manufacturer	Model no/Serial No.	Last Cal.
1	Spectrum Analyzer	ADVANTEST	R3273 / 95090431	Oct. 10, 2011
2	RF ROOM			

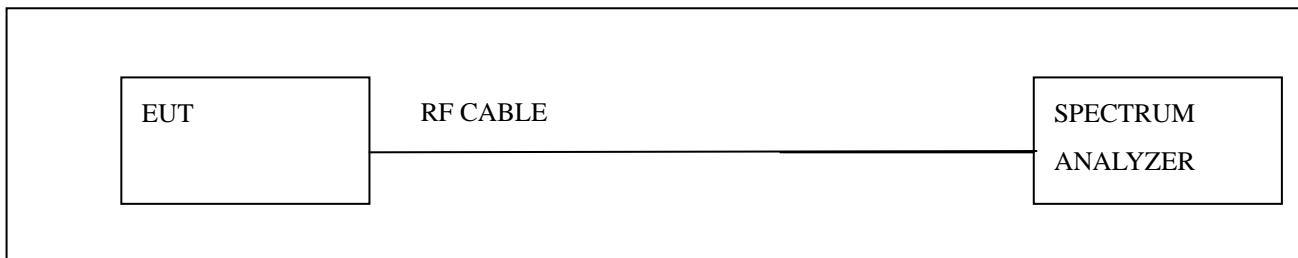
Note : All equipment upon which need to calibrated are with calibration period of 1 year.

◆ Limits

The maximum peak output power of the intentional radiator shall not exceed the following :

1. According to §15.247(b)(3), for systems using digital modulation in the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz : 1Watt.
2. According to §15.247(b)(4), the conducted output power limit specified in paragraph(b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph(c) of this section, 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 in paragraphs(b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi

◆ Test Setup



◆ Test Procedure

1. The transmitter output is connected to the Spectrum analyzer. The Spectrum analyzer is set to the peak power detection.
2. The testing follows the Measurement Procedure 5.2.1.1 of FCC KDB No. 558074 DTS Meas. Guidance DR01



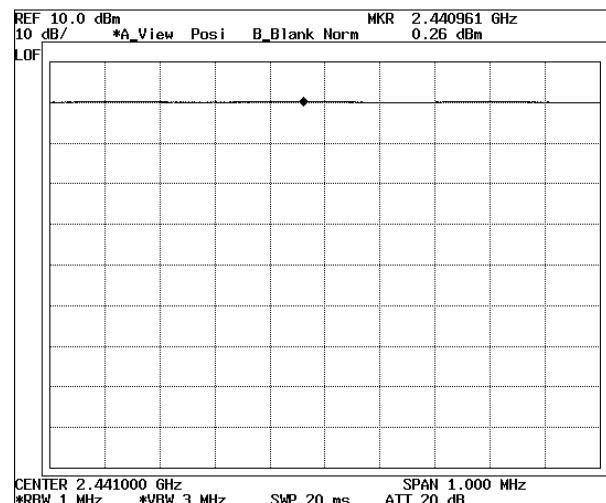
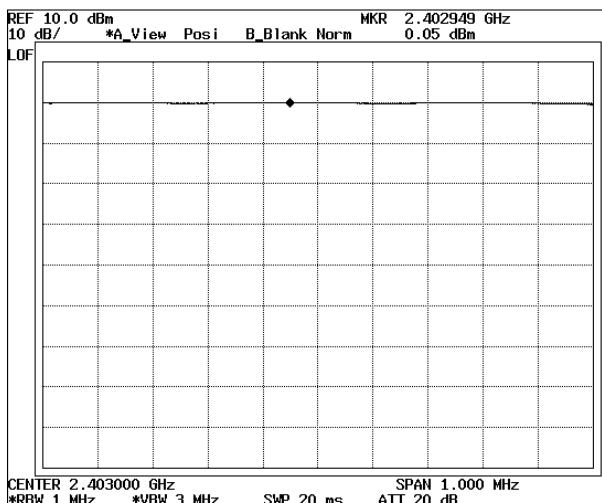
Peak Power Test result

Product	RH-750
Test Item	Peak Power Output
Test Mode	Transmit
Test Site	RF Room
Measurement Method	Conducted

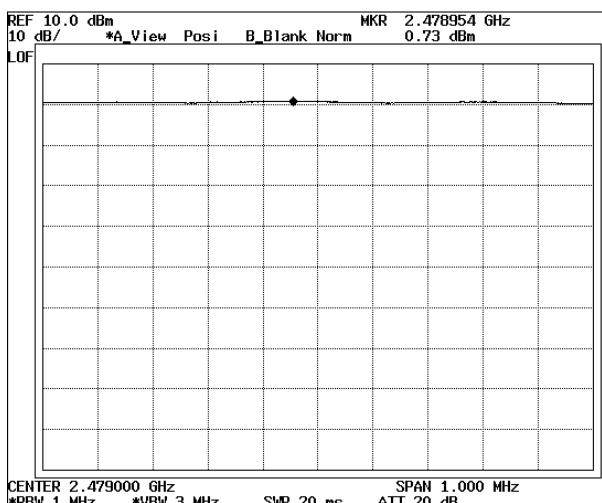
Channel No.	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Result
Low	2403	0.05	1Watt=30dBm	Pass
Mid	2441	0.26	1Watt=30dBm	Pass
High	2479	0.73	1Watt=30dBm	Pass

Low

Mid



High



Note : Measurement level = reading level + correct factor



Band Edge

◆ TEST Equipment

The following test equipment are used during the test:

Name	Type	Manufacturer	Calibration. Date	Serial Number
ESCI7	EMI Receiver	Rohde & Schwarz	July. 16, 2013	100872
SPECTRUM ANALYZER	R3273	ADVANTEST	Oct. 10, 2011	95095431
HORN-Antenna	3115	EMCO	Nov. 12, 2011	9012-3602
HORN-Antenna	HF906	Rohde & Schwarz	Nov. 12, 2011	100530
PRE AMPLIFIER	8449B OPT H02	Rohde & Schwarz	Oct. 10, 2011	3008A0530

Note : 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to RRL, KRISS, KTL and HCT.

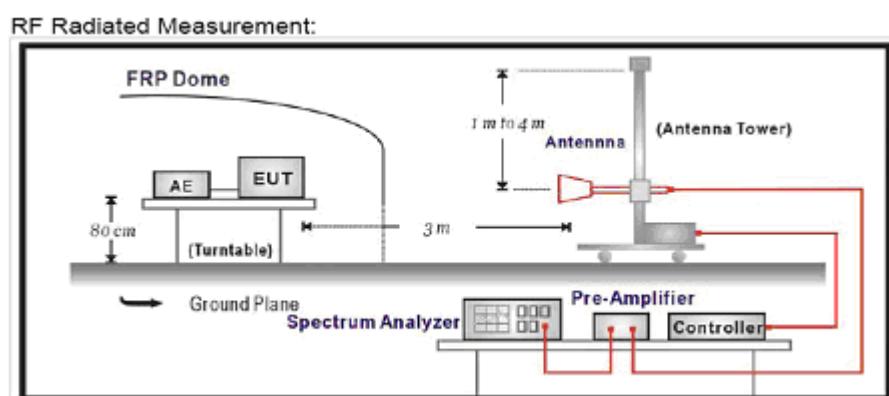
2. The calibration interval of horn ant. and loop ant. is 24 months

◆ Limits

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum 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.

Attenuation below the general limits specified in section 15.209(a) is not required. In addition, radiated emission which fall in the restricted bands, as defined in section 15.205(a), must also comply with the radiated emission limits specified in section 15.209(a) (see Section 15.205(c)).

◆ Test Setup





◆ Test procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters. The antenna can move up and down between 1 meter and 4 meters to fine out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.4:2003 on radiated measurement.

The bandwidth below 1 GHz setting on the field strength meter is 120 kHz, above 1GHz are 1MHz.

Test specification

According to FCC Part 15 Subpart C paragraph 15.247

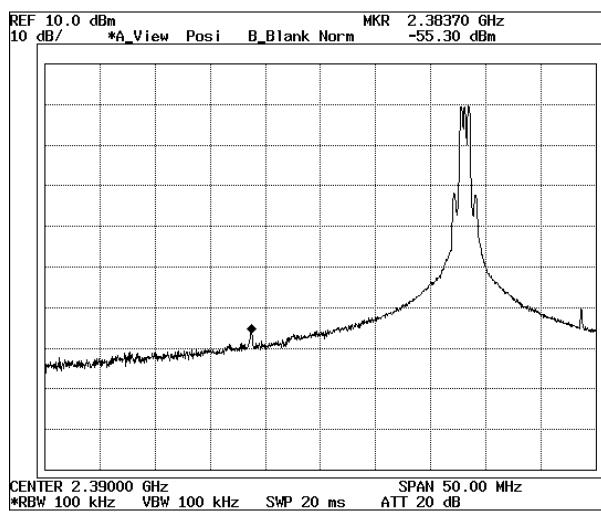
The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance and TCB Workshop 2012, April.



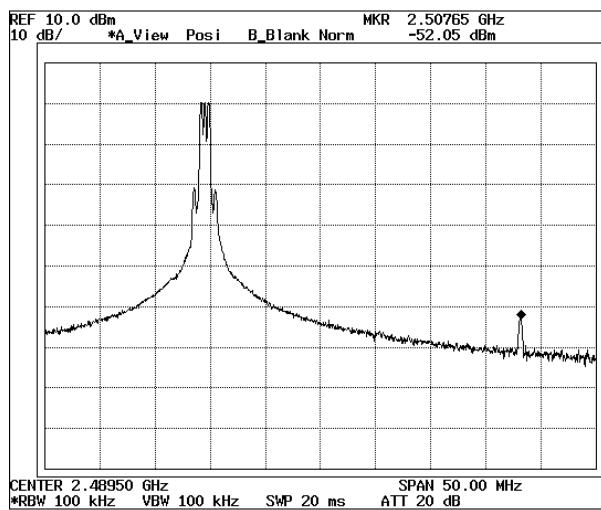
Band Edge Test result

Product	RH-750
Test Item	Band Edge
Test Mode	Transmit Low/High
Test Site	GHz Chamber
Measurement Method	Conducted / Radiated

Low (2403 MHz)



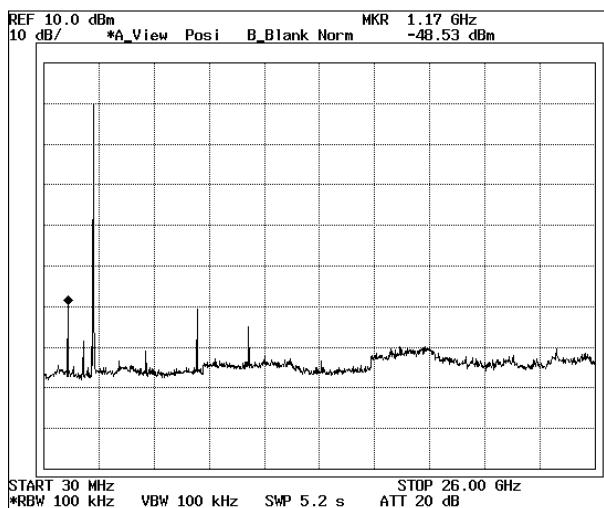
High (2479 MHz)



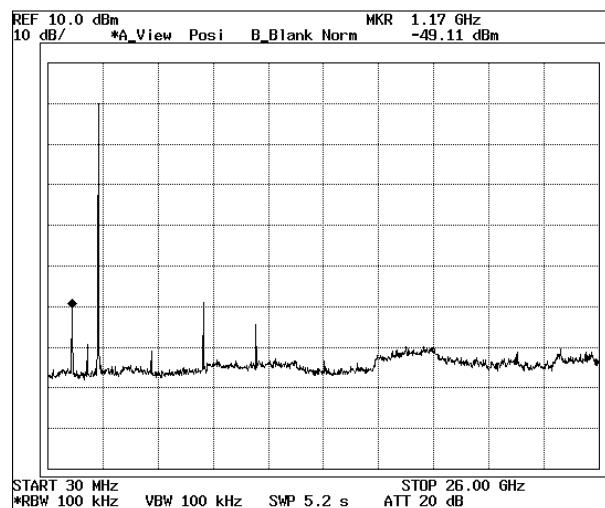


Spurious

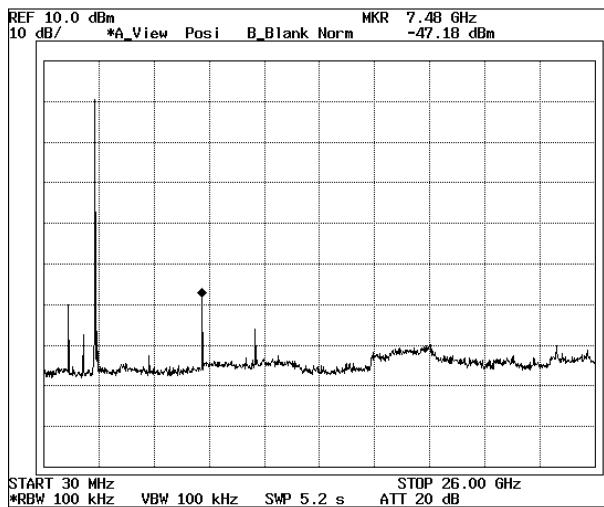
Low



Mid



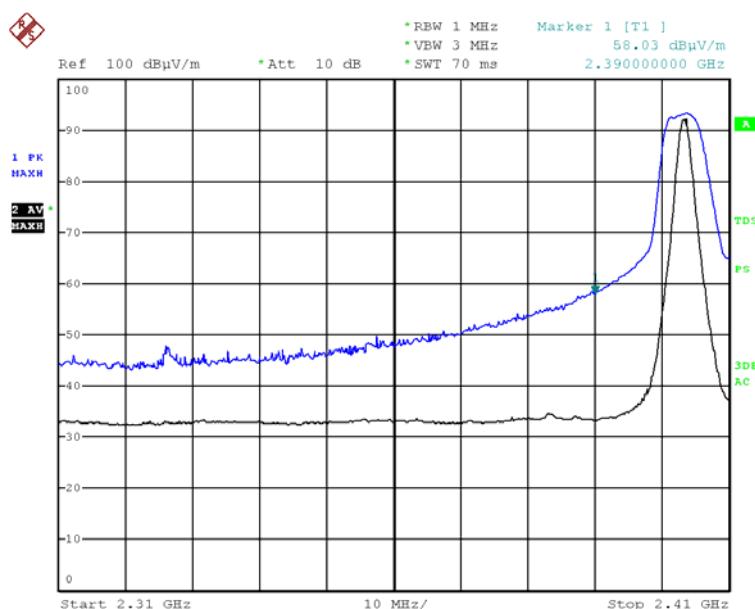
High



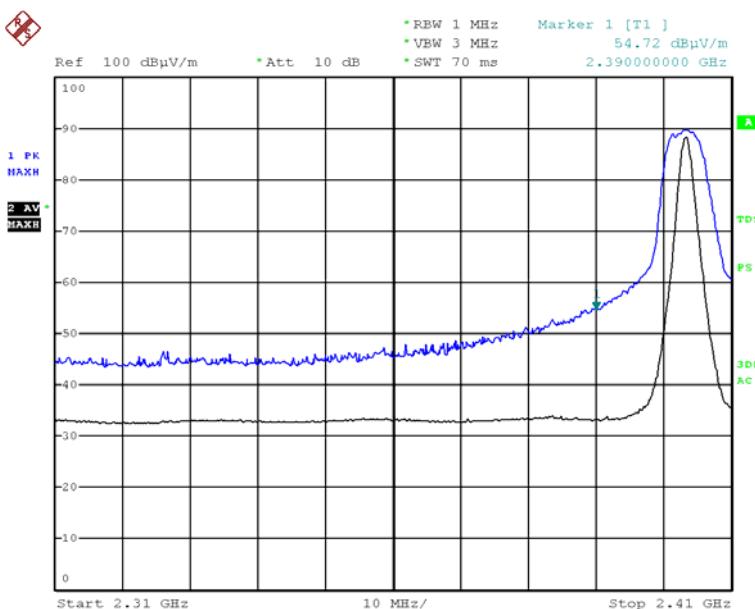


Low (2403 MHz)

Horizontal



Vertical



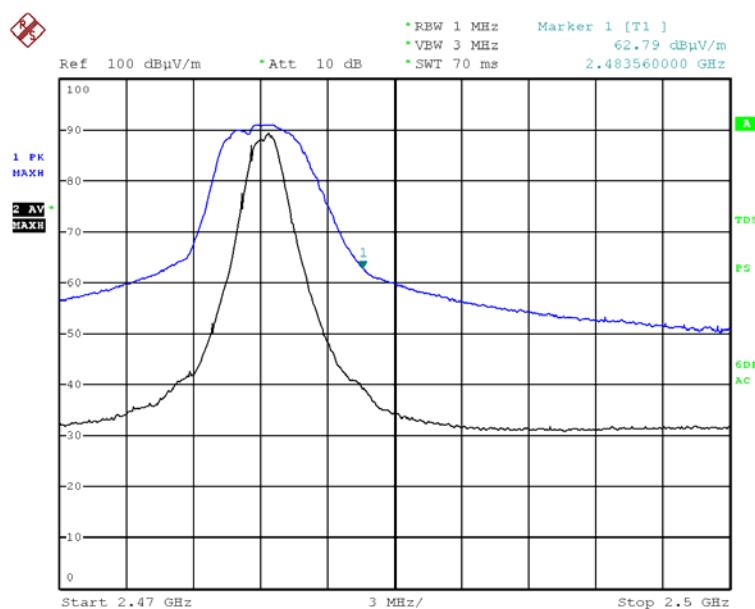
Restricted Band Edge Test Data

Frequency GHz	Reading dBuV		P	Limit dBuV		Margin dB	
	Peak	AV		Peak	AV	Peak	AV
2.390	58.03	33.25	H	74.00	54.00	15.97	20.75
2.390	54.72	33.64	V	74.00	54.00	19.28	20.36

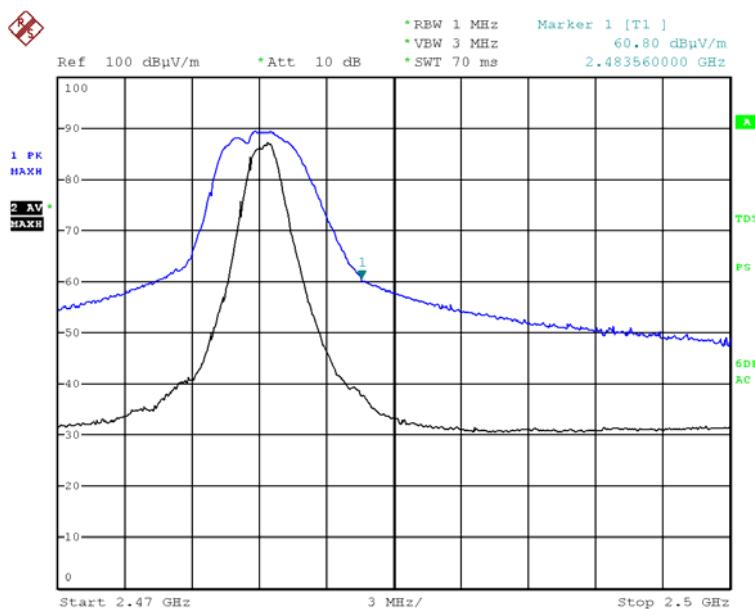


High (2479 MHz)

Horizontal



Vertical



Restricted Band Edge Test Data

Frequency GHz	Reading dB μ V		P	Limit dB μ V		Margin dB	
	Peak	AV		Peak	AV	Peak	AV
	2.48356	62.79	40.68	H	74.00	54.00	11.21
2.48356	60.80	38.92	V	74.00	54.00	13.20	15.08



6dB Band

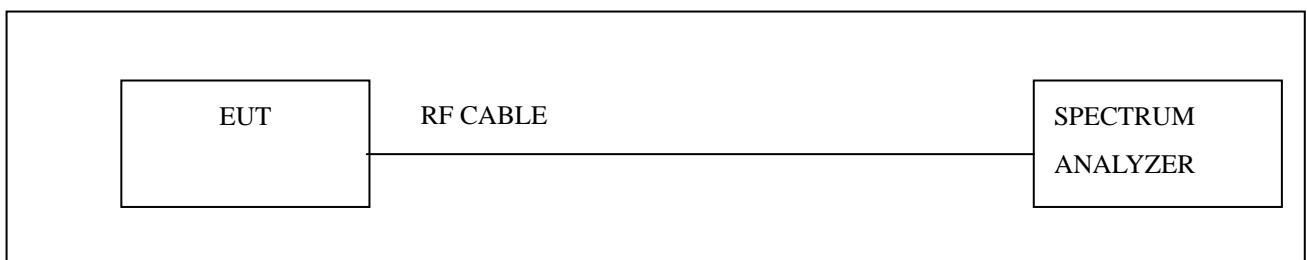
◆ Test Equipment

The following test equipment are used during the test:

Item	Equipment	Manufacturer	Model no/Serial No.	Last Cal.
1	Spectrum Analyzer	ADVANTEST	R3273 / 95090431	Oct.10, 2011
2	RF ROOM			

Note : All equipment upon which need to calibrated are with calibration period of 1 year.

◆ Test Setup



◆ Limits

(a) Operation under the provisions of this Section is limited to frequency hopping and digitally modulated intentional radiators that comply with the following provisions :

(2) systems using digital modulation techniques may operate in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

◆ Test Procedure

1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance and TCB Workshop 2012, April.
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable. The path loss was compensated to the results for each measurement.
3. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 1-5% of the emission bandwidth (EBW). Set the Video bandwidth (VBW) > 3 *RBW. In order to make an accurate measurement. The 6dB bandwidth must be greater than 500 KHz
4. The marker-delta reading at this point is the 6dB bandwidth of the emission.



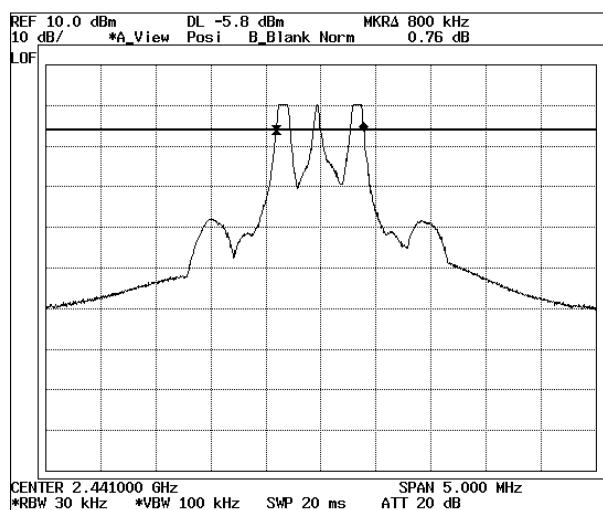
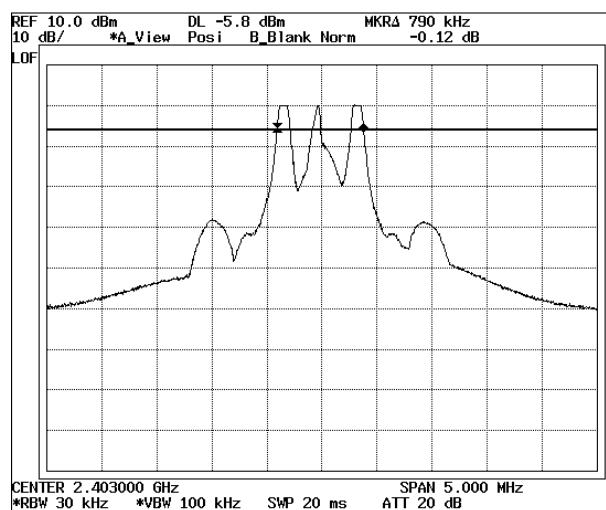
Test result

Product	RH-750
Test Item	6dB Band
Test Mode	Transmit
Test Site	RF Room
Measurement Method	Conducted

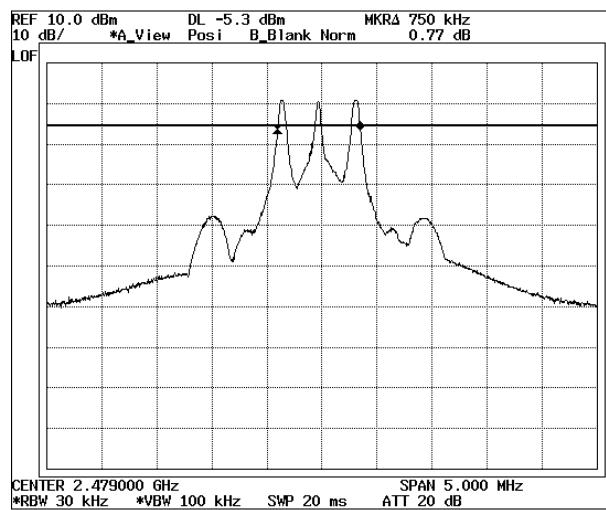
Channel No.	Frequency (MHz)	Measure Level (KHz)	Limit (KHz)	Result
Low	2403	790	>500	Pass
Mid	2441	800	>500	Pass
High	2479	750	>500	Pass

Low

Mid



High





Power Density

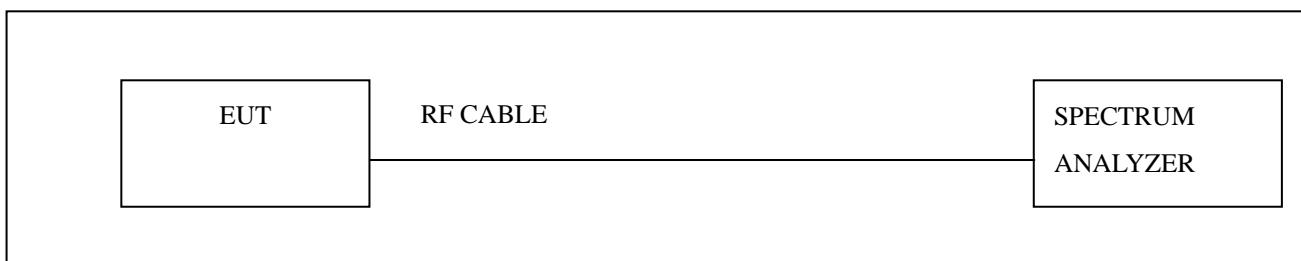
◆ Test Equipment

The following test equipment are used during the test:

Item	Equipment	Manufacturer	Model no/Serial No.	Last Cal.
1	Spectrum Analyzer	ADVANTEST	R3273 / 95090431	Oct. 10, 2011
2	RF ROOM			

Note : All equipment upon which need to calibrated are with calibration period of 1 year.

◆ Test Setup



◆ Limits

Section 15.247 (e) For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (v) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

◆ Test Procedure

The Measurement Procedure PKPSD was set according to the FCC KDB 558074. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW and then scale the observed power level to an equivalent value in 3 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where $BWCF = 10\log(3 \text{ kHz}/100 \text{ kHz}) = -15.2 \text{ dB}$.

Antenna output of the EUT was coupled directly to spectrum analyzer; if an external attenuator and/or cable was used, these losses are compensated for with the analyzer OFFSET function.

Limit: The Power Density does not exceed 8dBm/ 3 kHz.



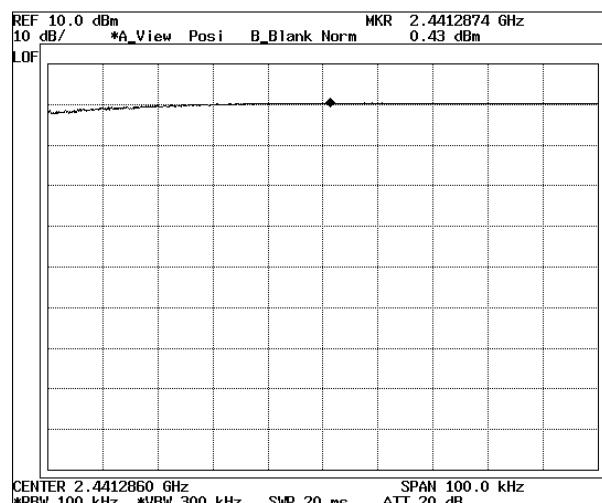
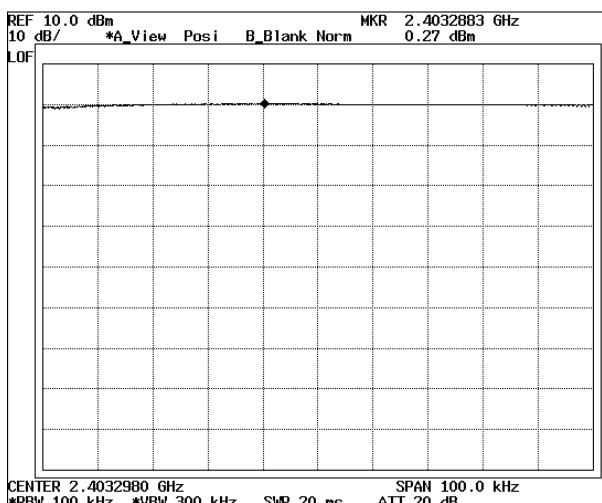
Test result

Product	RH-750
Test Item	Power Density
Test Mode	Transmit
Test Site	RF Room
Measurement Method	Conducted

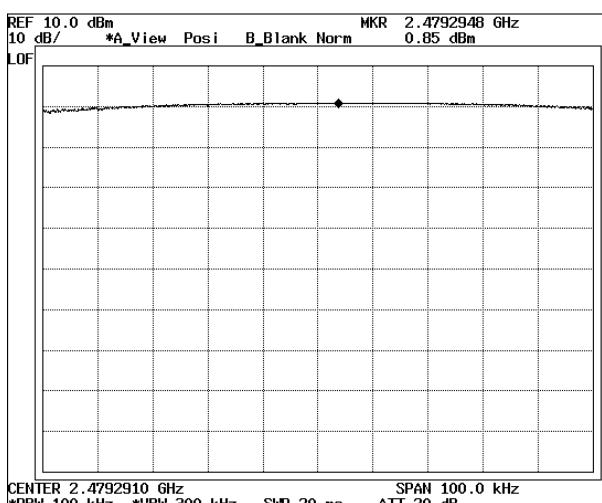
Channel	Frequency (MHz)	Measured PSD/100KHz (dBm)		Limit (dBm)	Result
		PSD/3KHz (dBm)	PSD/100KHz (dBm)		
Low	2403	0.27	-14.93	< 8	Pass
Mid	2441	0.43	-14.77	< 8	Pass
High	2479	0.85	-14.35	< 8	Pass

Low

Mid



High



Note : Measurement level = reading level + correct factor



Antenna requirements

According to FCC 47 CFR 15.203

“an intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached or an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section”

* the antenna of this EUT is a unique(PCB Antenna).

* the EUT complies with the requirement of 15.203

