1 Cover Page

RF TEST REPORT

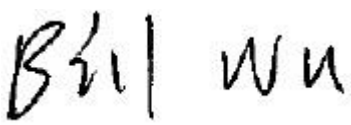
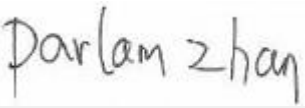
Application No.:	SHEM1906013987CR
FCC ID:	2AGOFRC377C
Applicant:	HCS (Suzhou) Limited
Address of Applicant:	19F-20F, Building B-3rd, No. 209 Zhuyuan Road, New District, Suzhou, P.R. China
Manufacturer:	HCS (Suzhou) Limited
Address of Manufacturer:	19F-20F, Building B-3rd, No. 209 Zhuyuan Road, New District, Suzhou, P.R. China
Factory:	WuJiang Century Billion Electronic Technology Co.,Ltd
Address of Factory:	No.149 Tuncunwest Road, Tongli Town. Wujiang. Jiangsu Province. China
Equipment Under Test (EUT):	
EUT Name:	Remote Control
Model No.:	RC37737XX/XXBR ("XX"=00-99), RC8XV(X=0~9) ¤
¤	Please refer to section 2 of this report which indicates which model was actually tested and which were electrically identical.
Standard(s) :	47 CFR Part 15, Subpart C 15.249
Date of Receipt:	2019-06-11
Date of Test:	2019-06-11 to 2019-06-18
Date of Issue:	2019-07-26
Test Result:	**Pass***

* In the configuration tested, the EUT complied with the standards specified above.

Parlam Zhan
E&E Section Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.

Revision Record			
Version	**Description**	**Date**	**Remark**
00	Original	2019-07-26	/

Authorized for issue by:				
				
		Bill Wu / Project Engineer		
				
		Parlam Zhan / Reviewer		

2 Test Summary

Test Item	Test Requirement	Test method	Result
Antenna Requirement	FCC Part 15, Subpart C Section 15.203	---	PASS
Duty Cycle	FCC Part 15, Subpart C Section 15.35(c)	ANSI C63.10 (2013) Section 7.5	PASS
AC Power Line Conducted Emission	FCC Part 15, Subpart C Section 15.207	ANSI C63.10 (2013) Section 6.2	N/A
Field Strength of the Fundamental Signal	FCC Part 15, Subpart C Section 15.249 (a)	ANSI C63.10 (2013) Section 6.6	PASS
Radiated Spurious Emissions and Band-edge	FCC Part 15, Subpart C Section 15.249 (a) &15.209&15.205	ANSI C63.10 (2013) Section 6.4&6.5&6.6&6.10	PASS
20dB Bandwidth	FCC Part 15, Subpart C Section 15.215 (c)	ANSI C63.10 (2013) Section 6.9.2	PASS
Remark: N/A: This EUT is powered by battery only; therefore the test on mains terminals is not applicable.			

Note: Declaration of EUT Family Grouping:

There are series models mentioned in this report and they are the similar in electrical and electronic characters. Only the model RC3773701/01BR was tested since their differences are Printinq, Profile software, model number. Customer model name is RC8XV(X=0~9).

3 Contents

4 General Information

4.1 General Description of E.U.T.

Product Description:	Portable product with BT function
Power Supply:	DC 3V by 2* AA.LR6 batteries for transmitter Supply the EUT with fully charged battery during the testing.

4.2 Technical Specifications:

Operation Frequency:	2402MHz~2480MHz
Bluetooth Version:	BT 4.2 BLE mode
Modulation Technique:	GFSK
Number of Channel:	40
Antenna Type	Dipole PCB antenna
Antenna Gain	-4.08 dBi

4.3 Description of Support Units

The EUT has been tested independently.

4.4 Test Mode

Test Mode	Description of Test Mode
Engineering Mode:	Using test software to control EUT working in continuous transmitting and receiving, and select channel and modulation type

4.5 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd. Shanghai Branch

588 West Jindu Road, Xinqiao, Songjiang, 201612 Shanghai, China

Tel: +86 21 6191 5666 Fax: +86 21 6191 5678

No tests were sub-contracted.

4.6 Test Facility

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

• CNAS (No. CNAS L0599)

CNAS has accredited SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. to ISO/IEC 17025:2005 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.

• NVLAP (Certificate No. 201034-0)

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. is accredited by the National Voluntary Laboratory Accreditation Program(NVLAP). Certificate No. 201034-0.

• FCC –Designation Number: CN5033

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been recognized as an accredited testing laboratory.

Designation Number: CN5033. Test Firm Registration Number: 479755.

• Innovation, Science and Economic Development Canada

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. EMC Laboratory has been recognized by ISED as an accredited testing laboratory.

IC Registration No.: 8617A-1. CAB identifier: CN0020.

• VCCI (Member No.: 3061)

The 3m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-13868, C-14336, T-12221, G-10830 respectively.

4.7 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Radio Frequency	±8.4 x 10-8
2	Timeout	±2s
3	Duty cycle	±0.37%
4	Occupied Bandwidth	±3%
5	RF conducted power	±0.6dB
6	RF power density	±2.84dB
7	Conducted Spurious emissions	±0.75dB
8	RF Radiated power	±4.6dB (Below 1GHz)
		±4.1dB (Above 1GHz)
9	Radiated Spurious emission test	±4.2dB (Below 30MHz)
		±4.4dB (30MHz-1GHz)
		±4.8dB (1GHz-18GHz)
		±5.2dB (Above 18GHz)
10	Temperature test	±1°C
11	Humidity test	±3%
12	Supply voltages	±1.5%
13	Time	±3%

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

5 Equipments Used during Test

Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Radiated Test					
EMI test Receiver	R&S	ESU40	SHEM051-1	2018-12-20	2019-12-19
Spectrum Analyzer	R&S	FSP-30	SHEM002-1	2018-12-20	2019-12-19
Loop Antenna (9kHz-30MHz)	Schwarzbeck	FMZB1519	SHEM135-1	2017-04-10	2020-04-09
Antenna (25MHz-2GHz)	Schwarzbeck	VULB9168	SHEM048-1	2017-02-28	2020-02-27
Antenna (25MHz-3GHz)	Schwarzbeck	HL562	SHEM010-1	2017-02-28	2020-02-27
Horn Antenna (1-8GHz)	Schwarzbeck	HF906	SHEM009-1	2017-10-24	2020-10-23
Horn Antenna (1-18GHz)	Schwarzbeck	BBHA9120D	SHEM050-1	2017-01-14	2020-01-13
Horn Antenna (14-40GHz)	Schwarzbeck	BBHA 9170	SHEM049-1	2017-12-03	2020-12-02
Pre-amplifier (9KHz-2GHz)	CLAVIIO	BDLNA-0001	SHEM164-1	2018-08-13	2019-08-12
Pre-amplifier (1-18GHz)	CLAVIIO	BDLNA-0118	SHEM050-2	2018-08-13	2019-08-12
High-amplifier (14-40GHz)	Schwarzbeck	10001	SHEM049-2	2018-12-20	2019-12-19
Signal Generator	R&S	SMR40	SHEM058-1	2018-08-13	2019-08-12
Band Filter	LORCH	9BRX-875/X150	SHEM156-1	/	/
Band Filter	LORCH	13BRX-1950/X500	SHEM083-2	/	/
Band Filter	LORCH	5BRX-2400/X200	SHEM155-1	/	/
Band Filter	LORCH	5BRX-5500/X1000	SHEM157-2	/	/
High pass Filter	Wainwright	WHK3.0/18G	SHEM157-1	/	/
High pass Filter	Wainwright	WHKS1700	SHEM157-3	/	/
Semi/Fully Anechoic	ST	11*6*6M	SHEM078-2	2017-07-22	2020-07-21
RE test Cable	/	RE01, RE02, RE06	/	2018-12-26	2019-12-25

6 Test Results

6.1 E.U.T. test conditions

Requirements: 15.31(e) For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage. For battery operated equipment, the equipment tests shall be performed using a new battery.

Operating Environment:

Temperature:	20.0 -25.0 °C
Humidity:	35-75 % RH
Atmospheric Pressure:	99.2 -102kPa

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

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

Pursuant to Part 15.31(c) For swept frequency equipment, measurements shall be made with the frequency sweep stopped at those frequencies chosen for the measurements to be reported.

Test frequency is the lowest channel: 0 channel (2402MHz), middle channel: 19 channel (2440MHz) and highest channel: 39 channel (2480MHz) with fixed at channel.

6.2 Antenna Requirement

Standard requirement:

15.203 requirement:

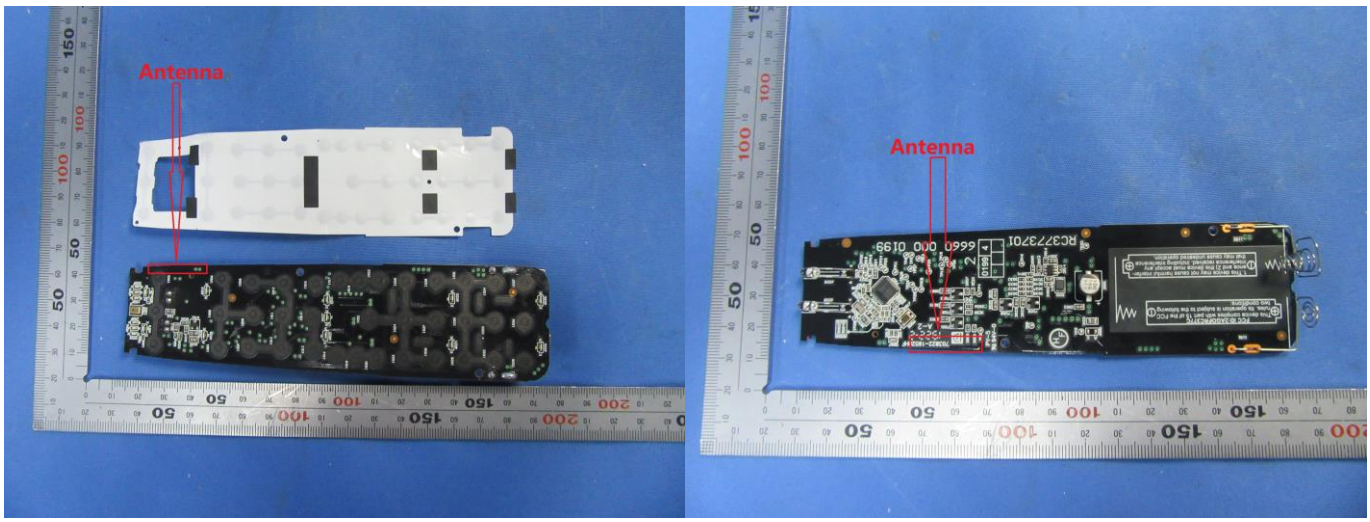
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited

15.247(b) (4) requirement:

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.

EUT Antenna:

The antenna is Dipole PCB antenna. The gain of the antenna is less than -4.08 dBi.



6.3 Conducted Emissions on Mains Terminals

Frequency Range: 150 KHz to 30 MHz

Class/Severity: Class B

Limit:

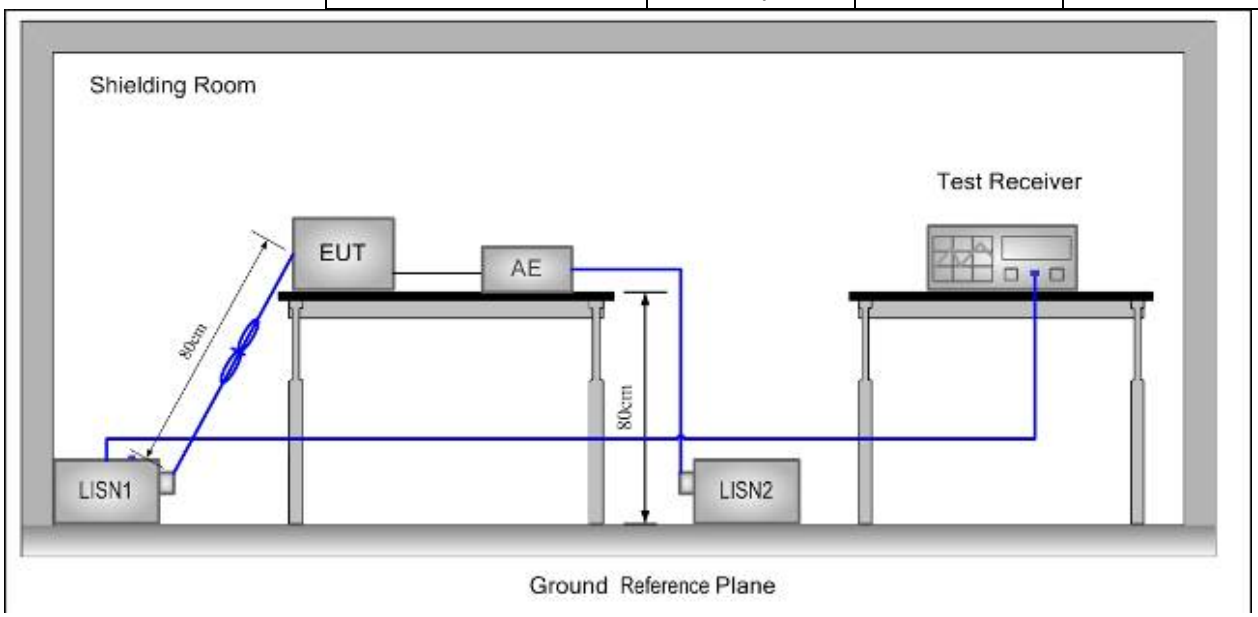
Frequency range MHz	Class B Limits: dB (μV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

Note1: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50MHz.

Note2: The lower limit is applicable at the transition frequency.

Test site/setup: Test instrumentation set-up:

Frequency Range	Detector	RBW	VBW
9KHz to 150Hz	Quasi-peak	200Hz	500Hz
150KHz to 30MHz	Quasi-peak	9kHz	30kHz



Test Procedure:

1. The mains terminal disturbance voltage was measured with the EUT in a shielded room.
2. The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides 50Ω/50μH + 5Ω linear impedance. The power cables of all other units of the EUT were connected to a second LISN, which was bonded to the ground reference plane in the same way as the LISN for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded
3. The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane, but separated from metallic contact with the ground reference plane by 0.1m of insulation.
4. The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4

m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISN mounted on top of the ground reference plane. This distance was between the closest points of the LISN and the EUT. The mains lead of EUT excess 0.8m was folded back and forth parallel to the lead so as to form a horizontal bundle with a length between 0.3m and 0.4m. All other units of the EUT and associated equipment were at least 0.8 m from the LISN.

Remark: Pre-scan was performed with peak detected on all ports, Quasi-peak & average measurements were performed at the frequencies at which maximum peak emission level were detected. Please see the attached Quasi-peak and Average test results.

Test Result: N/A

Test Data:

Note: This EUT is powered by battery only; therefore the AC Conducted Emission test is not applicable.

6.4 Duty Cycle

In order to assist with the determination of the average level of fundamental and spurious emissions field strength, measurements were made of duty cycle to determine the transmission duration and the silent period time of the transmitter. The transmitter duty cycle was measured using a spectrum analyser in the time domain and calculated by using the following calculation:

Duty cycle= T on time / Period

Duty factor = 20 * log (Duty cycle)

Test Data

TX Duty cycle: 1.360/100 = 1.36 %

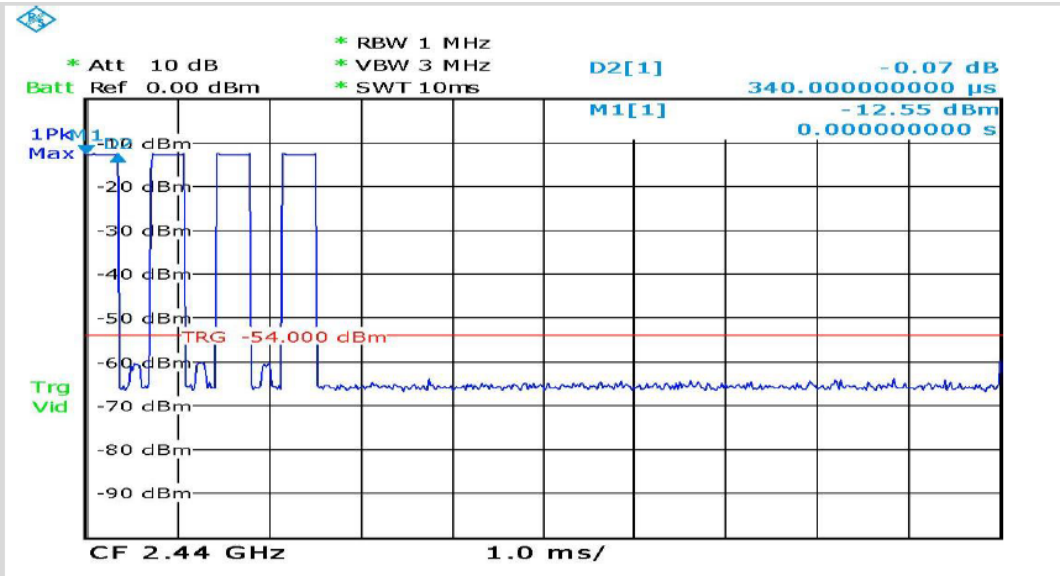
Corresponding FCC duty cycle correction factor is 20 * Log10(0.01360) = -37.32 dB.

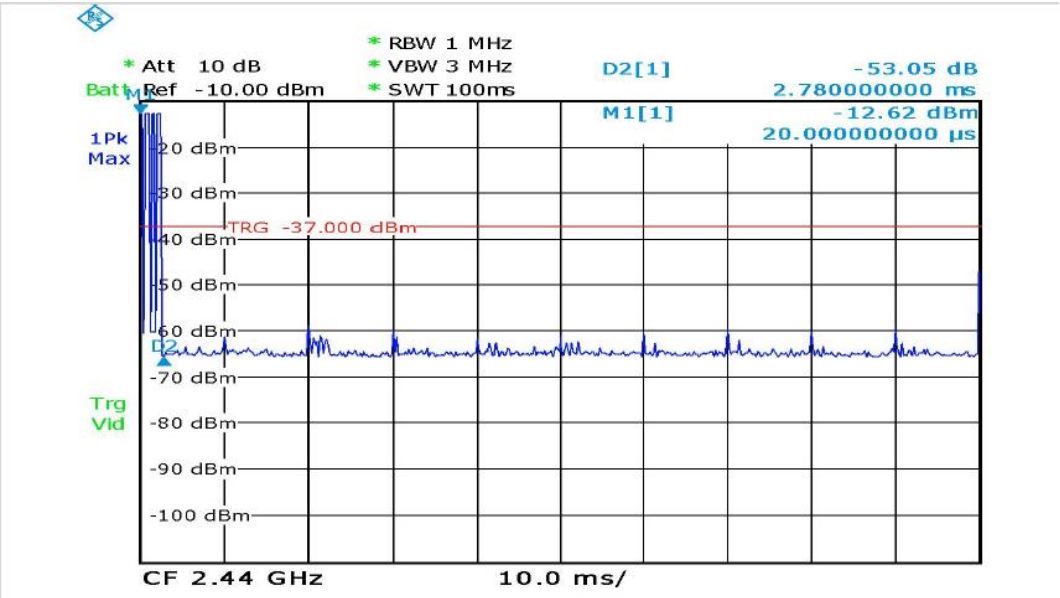
It is also possible to calculate the max duty cycle for an individual BLE channel.

The BLE standard requires a minimum number of used channels of 2. The pulses or the TX power will be equally spread over the 2 channels, so the max duty cycle per individual channel will be -37.32 – 6 = -43.32 dB. FCC will limit the correction factor to 20 dB.

So, Duty factor =20 dB

Test plot as follows:




RBW 1 MHz
Att 10 dB
VBW 3 MHz
Ref -10.00 dBm
SWT 100ms
D2[1]
-53.05 dB
2.780000000 ms
M1[1]
-12.62 dBm
20.000000000 µs
Batt
1Pk
Max
-20 dBm
-30 dBm
TRG -37.000 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
Trg
Vid
-80 dBm
-90 dBm
-100 dBm
CF 2.44 GHz
10.0 ms/

6.5 Field Strength of the Fundamental Signal

Test Site: Measurement Distance: 3m

Receiver Setup:

Frequency	Detector	RBW	VBW	Remark
Above 1GHz	Peak	1MHz	3MHz	Peak
	Average	1MHz	10Hz	Average

Limit:

Frequency	Limit (dBuV/m)	Remark
2400-2483.5 MHz	114	Peak
	94	Average

Test Setup:

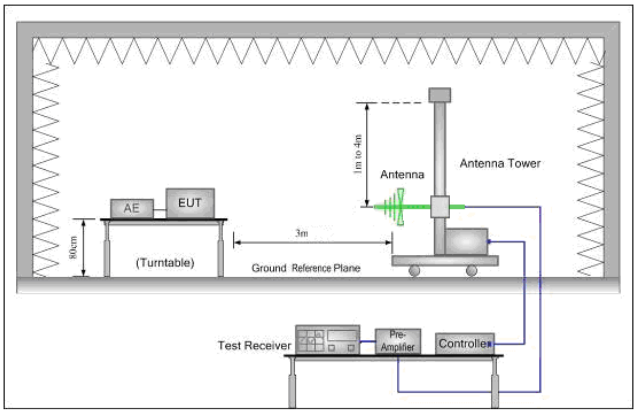


Figure 1. 30MHz to 1GHz

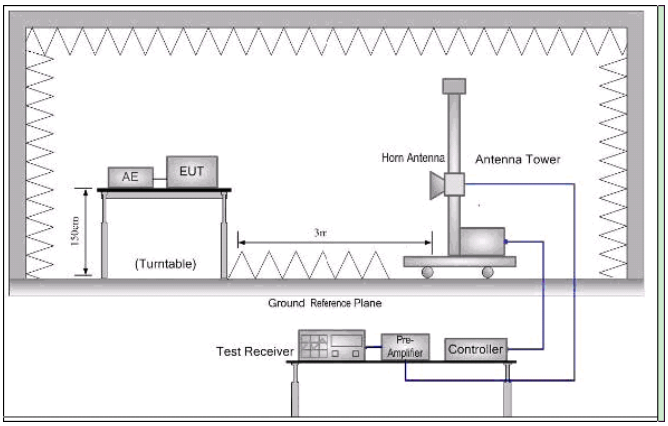


Figure 2. Above 1 GHz

Test Procedure:

a. The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.
b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
f. Repeat above procedures until all frequencies measured was complete.

Test Results: Pass

Test Data

Item	Freq.	Read Level	Factor	Result Level	Limit Line	Over Limit	Detector	Polarity
(Mark)	(MHz)	(dBμV)	(dB/m)	(dBμV/m)	(dBμV/m)	(dB)		
1	2402	105.08	-7.56	97.52	114	-16.48	Peak	Horizontal
2	2402	95.27	-7.56	87.71	114	-26.29	Peak	Vertical
3	2402	85.08	-7.56	77.52	94	-16.48	Average	Horizontal
4	2402	75.27	-7.56	67.71	94	-26.29	Average	Vertical
5	2440	104.27	-7.39	96.88	114	-17.12	Peak	Horizontal
6	2440	98.08	-7.39	90.69	114	-23.31	Peak	Vertical
7	2440	84.27	-7.39	76.88	94	-17.12	Average	Horizontal
8	2440	78.08	-7.39	70.69	94	-23.31	Average	Vertical
9	2480	105.76	-7.25	98.51	114	-15.49	Peak	Horizontal
10	2480	97.34	-7.25	90.09	114	-23.91	Peak	Vertical
11	2480	85.76	-7.25	78.51	94	-15.49	Average	Horizontal
12	2480	77.34	-7.25	70.09	94	-23.91	Average	Vertical

Remark:

1) The basic equation with a sample calculation is as follows: Level = Read Level + Factor.
2) Average= Peak-20dB

(The Factor is calculated by adding the Antenna Factor, Cable Loss and Preamp Factor)

6.6 Radiated Spurious Emissions and Band-edge

Frequency Range: 9KHz to 25GHz

Test site/setup: Measurement Distance: 3m
Test instrumentation set-up:

Frequency Range	Detector	RBW	VBW
0.009MHz-0.090MHz	Peak	10kHz	30kHz
0.009MHz-0.090MHz	Average	10kHz	30kHz
0.090MHz-0.110MHz	Quasi-peak	10kHz	30kHz
0.110MHz-0.490MHz	Peak	10kHz	30kHz
0.110MHz-0.490MHz	Average	10kHz	30kHz
0.490MHz -30MHz	Quasi-peak	10kHz	30kHz
30MHz-1GHz	Quasi-peak	100kHz	300kHz
Above 1GHz	Peak	RBW=1MHz	VBW≥RBW
	Average		VBW=10Hz

Sweep=Auto

15.209 Limit:

Frequency	Limit (dBuV/m)
0.009MHz-0.490MHz	128.5 ~ 93.8
0.490MHz-1.705MHz	73.8 ~63.0
1.705MHz-30MHz	69.5
30MHz-88MHz	40.0
88MHz-216MHz	43.5
216MHz-960MHz	46.0
960MHz-1GHz	54.0
Above 1GHz	54.0

Note: 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.

Test Configuration: Receive antenna scan height 1 m - 4 m. polarization Vertical / Horizontal

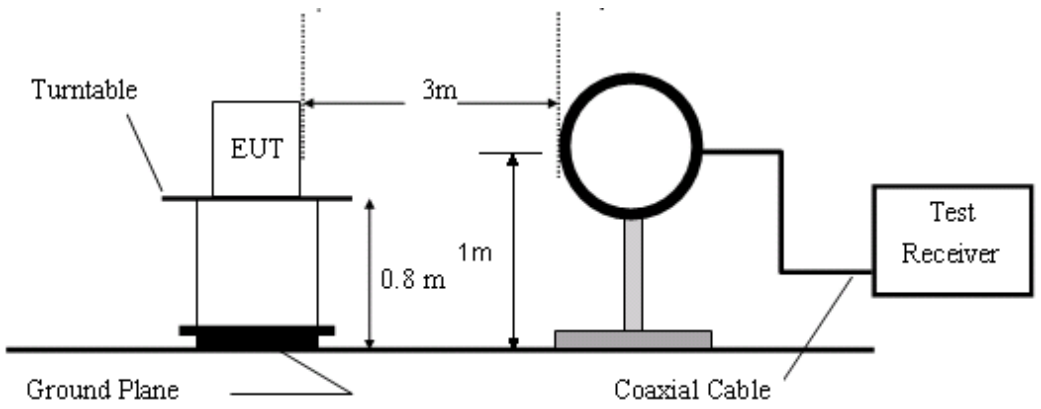


Figure1. 30MHz to 1GHz radiated emissions test configuration

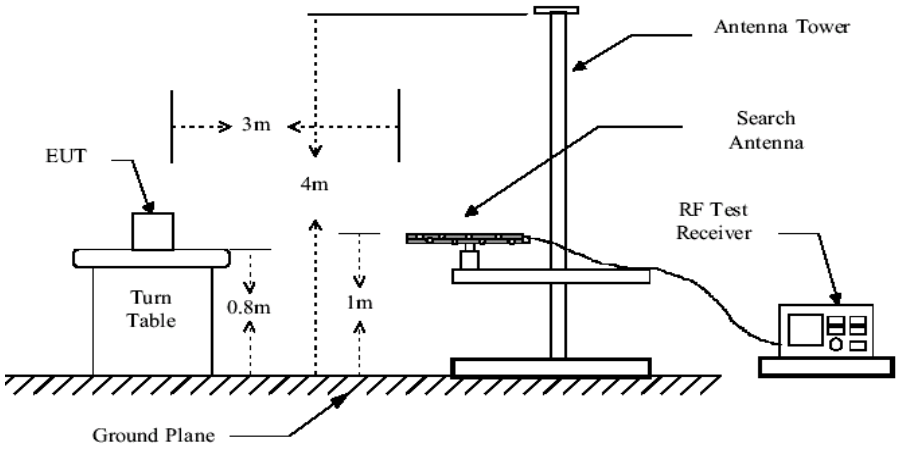


Figure2. 30MHz to 1GHz radiated emissions test configuration

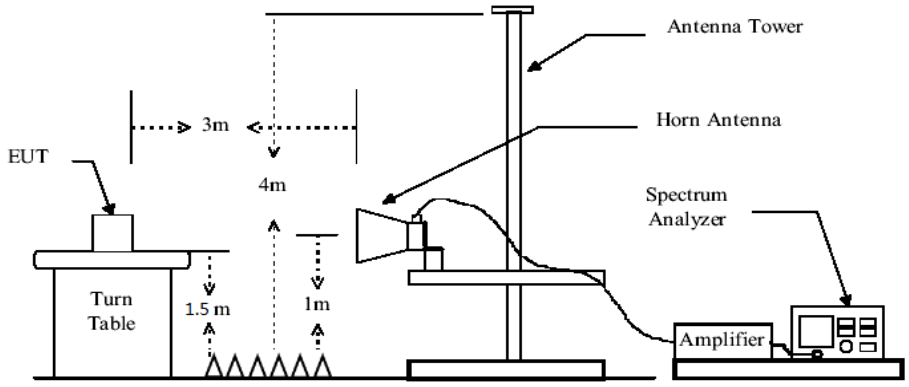


Figure3. Above 1GHz radiated emissions test configuration

Test Procedure: The procedure used was ANSI Standard C63.10. The receiver was scanned from 9KHz to 25GHz.When an emission was found, the table was rotated to produce the maximum signal strength. An initial pre-scan was performed for in peak detection mode using the receiver. The EUT was measured for both the Horizontal and Vertical polarities and performed a pre-test three orthogonal planes. For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage. The worst case emissions were reported.

Low noise amplifier was used below 1GHz, High pass Filter was used above 3GHz.

Between 1G and 3GHz, we did not use any amplifier or filter.

Pre-test was performed on Antenna A mode, Compliance test was performed on worse case (Antenna A mode).

Test were performed for their spatial orthogonal(X, Y, Z), the worst test data (X orthogonal) was submitted.

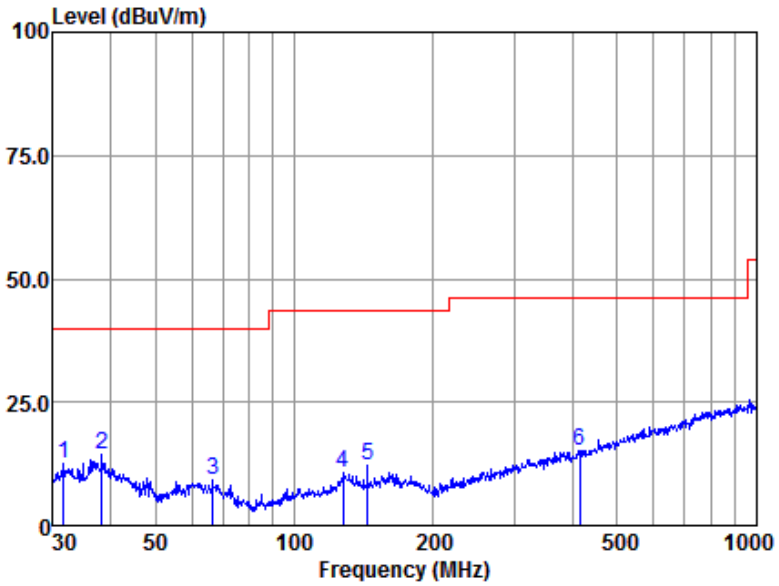
1) For this intentional radiator operates below 25 GHz. the spectrum shall be investigated to the tenth harmonic of the highest fundamental frequency. And above the third harmonic of this intentional radiator, the disturbance is very low. So the test result only displays to 4rd harmonic.
2) As shown in Section, for frequencies above 1000MHz. the above field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

.

Test Result: Pass

6.6.1 Radiated Spurious Emissions

30MHz-1GHz:
Vertical:

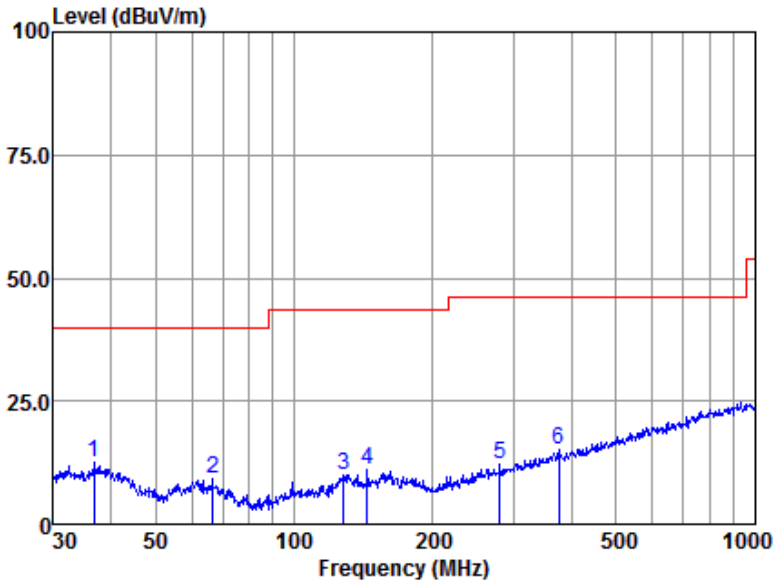


Antenna Polarity :VERTICAL
EUT/Project :13960CR
Test mode :a

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	31.620	38.87	15.48	0.45	42.37	12.43	40.00	-27.57	QP
2	38.346	40.14	16.15	0.46	42.34	14.41	40.00	-25.59	QP
3	66.499	39.27	11.80	0.62	42.28	9.41	40.00	-30.59	QP
4	127.218	39.27	12.14	1.41	42.27	10.55	43.50	-32.95	QP
5	143.830	41.50	11.51	1.37	42.24	12.14	43.50	-31.36	QP
6	414.722	38.64	15.44	3.04	41.87	15.25	46.00	-30.75	QP

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Horizontal:



Antenna Polarity :HORIZONTAL
EUT/Project :13960CR
Test mode :a

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	36.766	38.46	16.01	0.35	42.34	12.48	40.00	-27.52	QP
2	66.499	38.91	11.80	0.62	42.28	9.05	40.00	-30.95	QP
3	128.113	38.37	12.31	1.41	42.27	9.82	43.50	-33.68	QP
4	143.830	40.40	11.51	1.37	42.24	11.04	43.50	-32.46	QP
5	279.044	39.62	12.51	2.23	42.11	12.25	46.00	-33.75	QP
6	375.939	39.25	14.70	3.09	41.93	15.11	46.00	-30.89	QP

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Above 1GHz:

Lowest Channel(2402MHz)

Mark	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Emission (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	polarization
1	4804	47.80	1.57	49.37	54.00	-4.63	peak	Horizontal
2	7206	39.86	9.54	49.40	54.00	-4.60	peak	Horizontal
3	9608	32.87	15.22	48.09	54.00	-5.91	peak	Horizontal
4	4804	40.72	1.57	42.29	54.00	-11.71	peak	Vertical
5	7206	38.26	9.54	47.80	54.00	-6.20	peak	Vertical
6	9608	35.86	15.22	51.08	54.00	-2.92	peak	Vertical

Middle Channel(2440MHz)

Mark	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Emission (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	polarization
1	4880	48.11	1.51	49.62	54.00	-4.38	peak	Horizontal
2	7320	37.84	9.86	47.70	54.00	-6.30	peak	Horizontal
3	9760	36.38	15.59	51.97	54.00	-2.03	peak	Horizontal
4	4880	45.07	1.51	46.58	54.00	-7.42	peak	Vertical
5	7320	38.08	9.86	47.94	54.00	-6.06	peak	Vertical
6	9760	37.04	15.59	52.63	54.00	-1.37	peak	Vertical

Highest Channel(2480MHz)

Mark	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Emission (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	polarization
1	4960	50.87	1.65	52.52	54.00	-1.48	peak	Horizontal
2	7440	42.71	9.81	52.52	54.00	-1.48	peak	Horizontal
3	9920	33.90	16.12	50.02	54.00	-3.98	peak	Horizontal
4	4960	42.47	1.65	44.12	54.00	-9.88	peak	Vertical
5	7440	34.31	9.81	44.12	54.00	-9.88	peak	Vertical
6	9920	33.28	16.12	49.40	54.00	-4.60	peak	Vertical

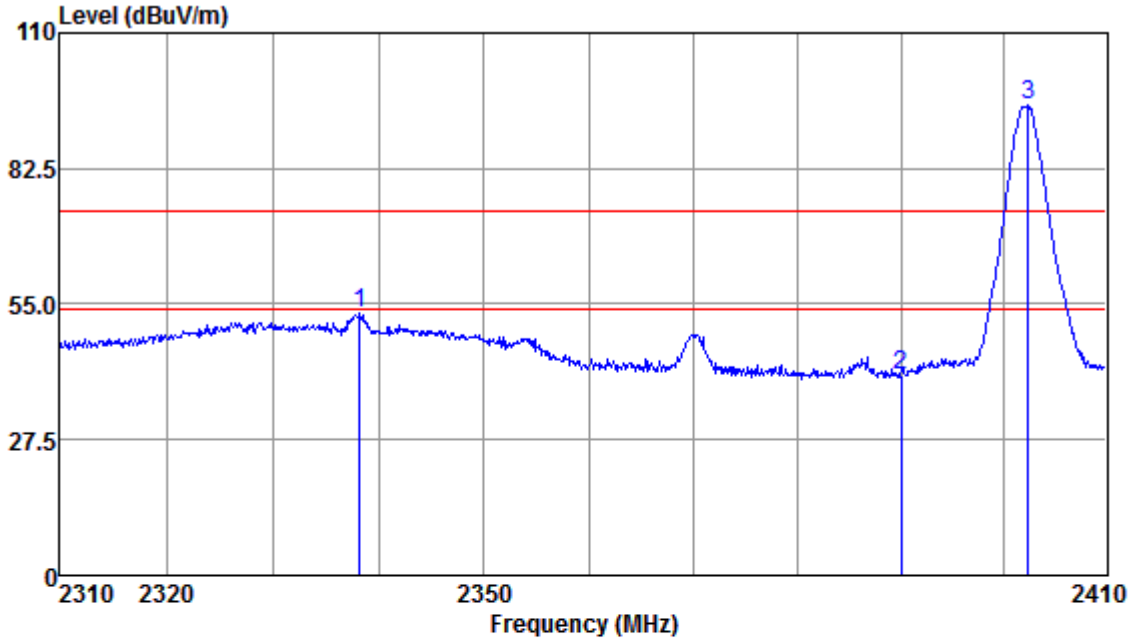
Remark: 1) Emission = Receiver Reading + Factor

2) Factor = Antenna Factor + Cable Loss -Pre-amplifier Factor.

3) If the Peak value below the AV Limit, the AV test doesn't perform for this submission.

6.6.2 Radiated Band-edge

Lowest Channel (2402MHz) Horizontal

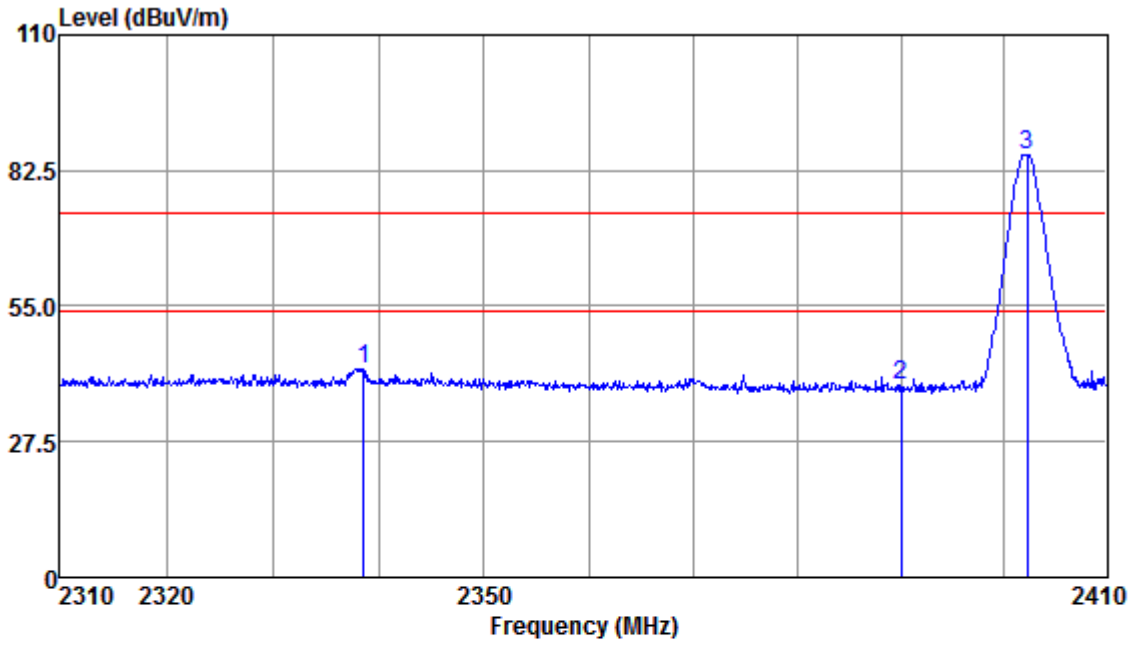


Antenna Polarity :HORIZONTAL

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
2338.17	61.53	25.96	3.08	37.37	53.20	74.00	-20.80	Peak
2390.00	48.92	26.03	3.15	37.40	40.70	74.00	-33.30	Peak
2402.35	103.45	26.05	3.14	37.40	95.24	74.00	21.24	Peak

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Lowest Channel (2402MHz) Vertical

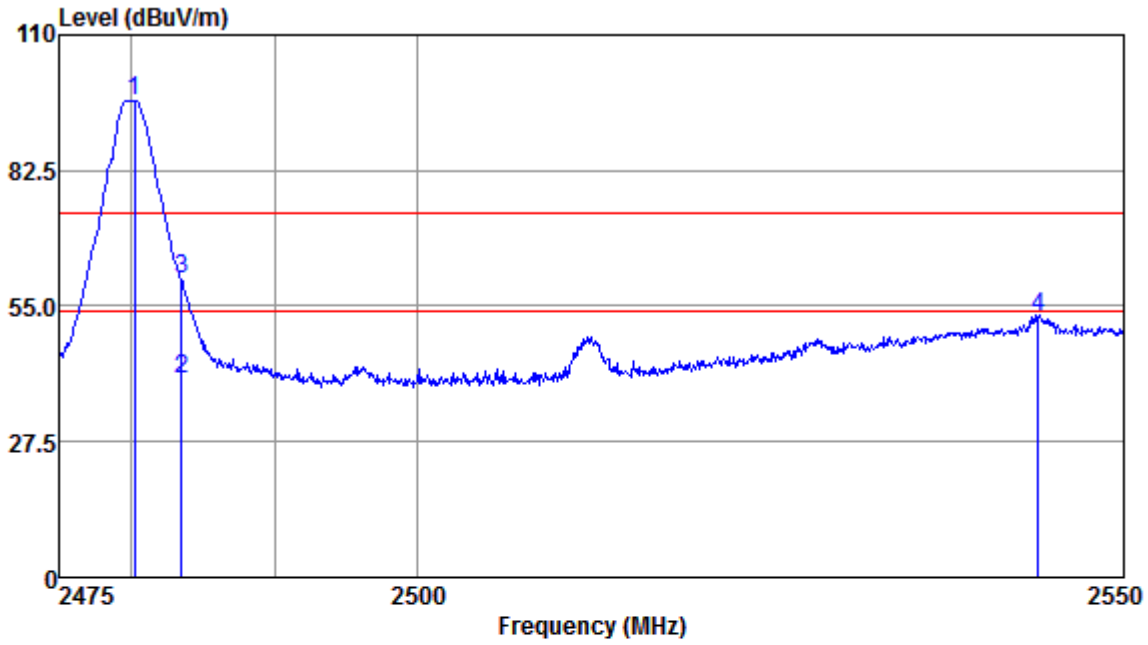


Antenna Polarity :VERTICAL

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
2338.57	50.69	25.96	3.08	37.37	42.36	74.00	-31.64	Peak
2390.00	47.25	26.03	3.15	37.40	39.03	74.00	-34.97	Peak
2402.25	93.97	26.05	3.14	37.40	85.76	74.00	11.76	Peak

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Highest Channel (2480MHz) Horizontal

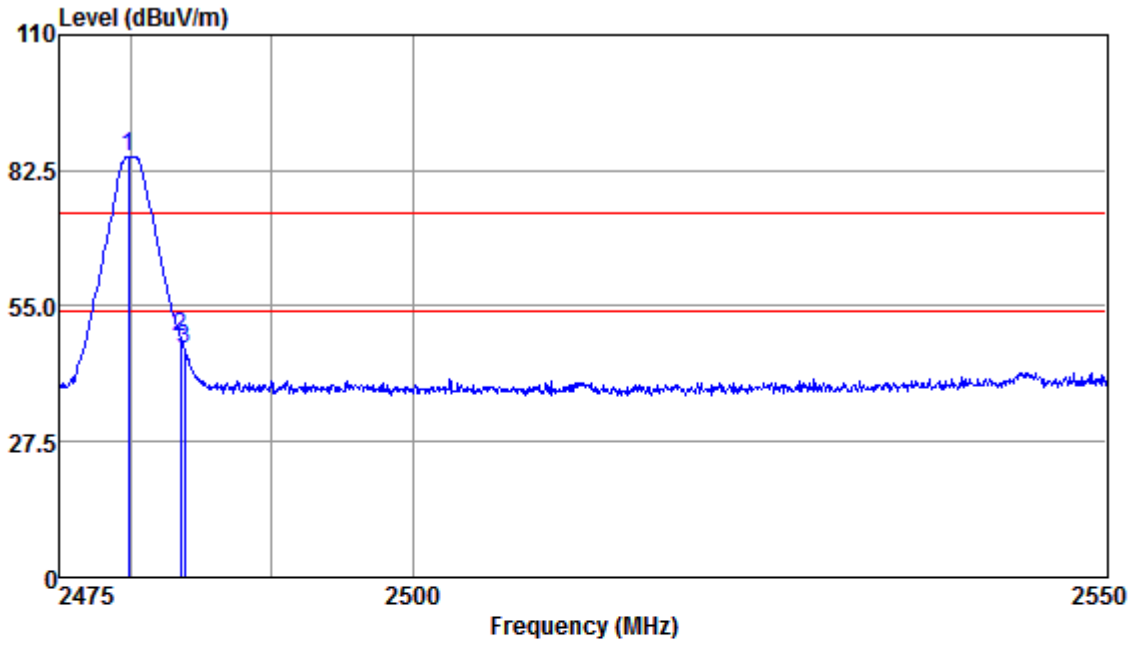


Antenna Polarity :HORIZONTAL

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
2480.25	105.03	26.17	3.14	37.57	96.77	74.00	22.77	Peak
2483.50	48.54	26.18	3.14	37.57	40.29	54.00	-13.71	Average
2483.50	68.54	26.18	3.14	37.57	60.29	74.00	-13.71	Peak
2543.92	60.90	26.33	3.17	37.63	52.77	74.00	-21.23	Peak

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Highest Channel (2480MHz) Vertical



Antenna Polarity :VERTICAL

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
2479.81	93.57	26.17	3.14	37.57	85.31	74.00	11.31	Peak
2483.50	56.93	26.18	3.14	37.57	48.68	74.00	-25.32	Peak
2483.81	54.49	26.18	3.14	37.57	46.24	74.00	-27.76	Peak

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Remark: 1. Test Level = Receiver Reading + Antenna Factor + Cable Loss- Preamplifier Factor

2. No any other emission which falls in restricted bands can be detected and be reported.

3. If the Peak value below the AV Limit, the AV test doesn't perform for this submission.

4. Average= Peak-20dB

All frequencies within the “Restricted bands” have been evaluated to compliance. Section 15.205 Restricted bands of operation.

Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

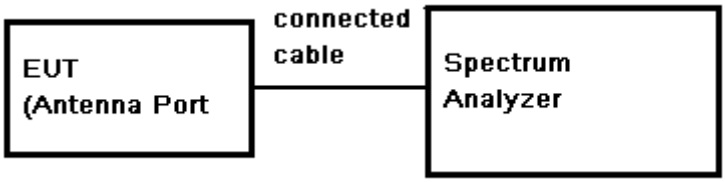
MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.5 - 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 -	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.52525	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	156.7 - 156.9	3260 - 3267	23.6 - 24.0
12.29 - 12.293	162.0125 - 167.17	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	167.72 - 173.2	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	240 - 285	3600 - 4400	([2])
13.36 - 13.41	322 - 335.4		

[1] Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz

[2] Above 38.6

6.7 20dB Bandwidth

Test Configuration:



Test Procedure:

1. Place the EUT on the table and set it in Engineering 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 = approximately 1 % to 5 % of the OBW (set 30 kHz), VBW =3* RBW, Span=2MHz, Sweep=auto
4. Mark the peak frequency and –20dB (upper and lower) frequency.
5. Repeat above procedures until all frequency measured was complete.

Limit: N/A

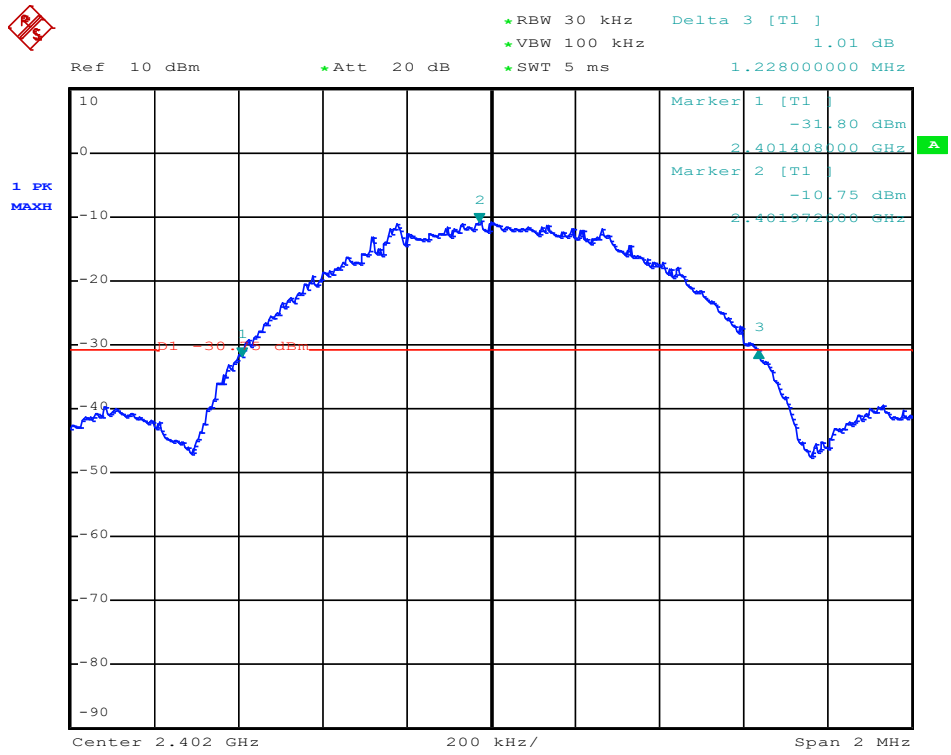
Test Result: Pass

Test Data:

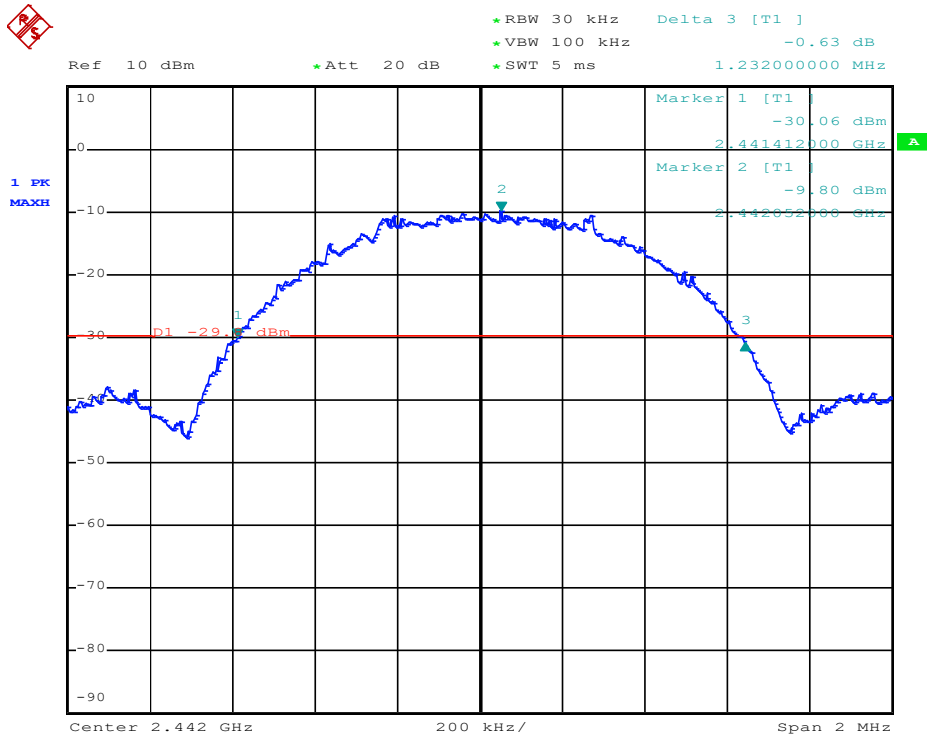
Channel	Frequency (MHz)	Bandwidth (MHz)	Result
Low	2402	1.228	PASS
Mid	2440	1.232	PASS
High	2480	1.248	PASS

Test plot as follows:

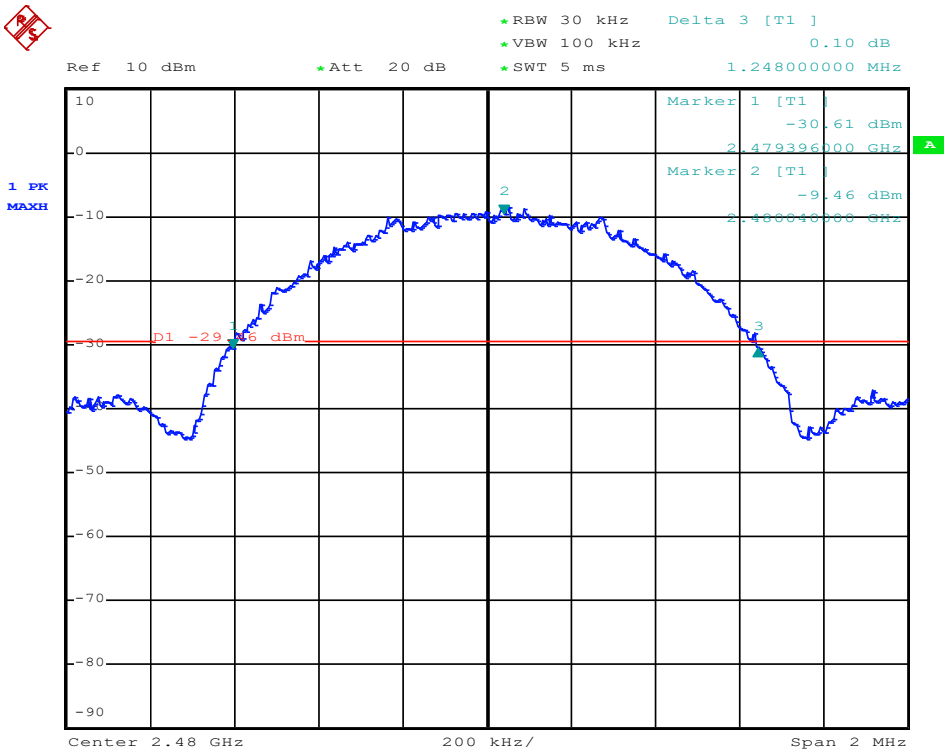
Channel: Lowest



Channel: Middle



Channel: High



7 Test Setup Photographs

Refer to the < Test Setup photos-FCC>.

8 EUT Constructional Details

Refer to the < External Photos > & < Internal Photos >.

--End of the Report--