

FCC PART 15C

MEASUREMENT AND TEST REPORT

Applicant : Shenzhen Techtion Electronic Co., Ltd
Address : 16N, Block B, Fortune Plaza, 7002 Shenzhen Road, Futian, Shenzhen, China
Equipment Type : Bluetooth Module
Brand Name : ISSC
Model(s) No. : TECHTION T46
FCC ID : YBX-BT-T46V108
Test Regulation : FCC 47 CFR Part 15 Subpart C 2009, Section 15.247
Test Result : Complied
Date of Test : April 24 to July 7, 2010
Prepared by : KTS International Laboratories Limited
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Approved by : 

Kathy Yeung/Manager

Notes : This test report shall not be produced in full or partial, without the written approval of KTS International Laboratories Limited
The results in this report apply only to the sample tested.
This test report must not be used by the customer to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government

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EXHIBIT INCLUDING:

BLOCK DIAGRAM
SCHEMATIC
LABEL SAMPLES
LABEL LOCATION
USER MANUAL
EXTERNAL PHOTOGRAPHS
INTERNAL PHOTOGRAPHS
OPERATIONAL DESCRIPTION
TEST SETUP PHOTOGRAPHS

SECTION 1: General Information:

Product Description for Equipment Under Test (EUT)

Client Information

Applicant: Shenzhen Techtion Electronic Co., Ltd

Address: 16N, Block B, Fortune Plaza, 7002 Shenzhen Road, Futian, Shenzhen, China

Manufacturer: Same as applicant

General description of EUT

EUT Name	:	Bluetooth Module
Model No.	:	TECHTION T46
Output Power	:	1.4 mW
Frequency of Operation	:	2402-2480 MHz
Power Supply	:	DC 3.3V
Antenna Type	:	PCB Pattern Antenna
Number of Channels	:	79
Channels Separation	:	1 MHz

Test Lab:

Measurements were made at the test site of SEM.Test Compliance Service Co., Ltd. Located at 3/F, Jinbao Commerce Building, Xin'an Fanshen Road, Bao'an District, Shenzhen, P.R.China.

The 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 files which the Registration No.: 994117.

Test Standards:

All measurements contained in this report were conducted with ANSI C63.4-2003 and DA-00-705.

SECTION 2: EMC EQUIPMENT LIST

DEVICE	MANUFACTURER	MODEL	SERIAL	CAL/CHAR DATI	DU ^E DATE
Spectrum Analyzer	ROHDE&SCHWARZ	FSEA20	DE25181	2009/08/12	2010/08/11
Positioning Controller	C&C	CC-C-1F	N/A	2009/08/12	2010/08/11
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	2009/07/21	2010/07/20
Horn Antenna	SCHWARZBECK	BBHX 9120	9120-426	2009/07/21	2010/07/20
RF Switch	EM	EMSW18	SW060023	2009/08/12	2010/08/11
Amplifier	Agilent	8447F	3113A06717	2009/08/12	2010/08/11
Coaxial Cable	SCHWARZBECK	AK9513	9513-10	2009/08/12	2010/08/11
Spectrum Analyzer	Agilent	E4402B	US41192821	2009/08/12	2010/08/11
EMI Test Receiver	ROHDE&SCHWARZ	ESPI	101611	2009/08/12	2010/08/11
Receiver Antenna	ETS	2175	57337	2009/08/12	2010/08/11
50 ohm Coaxial Cable	ETS	SUCOFLEX 104	25498514	2009/08/12	2010/08/11
Puls Limiter	ROHDE&SCHWARZ	ESH3-Z2	100911	2009/08/12	2010/08/11
LISN	SCHWARZBECK	NSLK8126	8126-224	2009/08/12	2010/08/11
LISN	EMCO	3825/2	11967C	2009/08/12	2010/08/11

SECTION 3: TEST PROCEDURE

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POWER LINE CONDUCTED INTERFERENCE:

The procedure used was ANSI STANDARD C63.4-2003 using a 50UH LISN. Both lines were observed with the UUT transmitting. The bandwidth of the spectrum analyzer was 10 kHz with an appropriate sweep speed. The ambient temperature of the UUT was 76F with a humidity of 55%.

BANDWIDTH 20 dB: The measurements were made with the spectrum analyzer's resolution bandwidth (RBW) = 1 MHz and the video bandwidth (VBW) = 3 MHz and the span set as shown on plot.

POWER OUTPUT: The RF power output was measured at the antenna feed point using a peak power meter.

ANTENNA CONDUCTED EMISSIONS: The RBW = 100 kHz, VBW = 300 kHz and the span set to 10.0 MHz and the spectrum was scanned from 30 MHz to the 10th Harmonic of the fundamental. Above 1 GHz the resolution bandwidth was 1 MHz and the VBW = 3 MHz and the span to 50 MHz.

RADIATION INTERFERENCE: The test procedure used was ANSI STANDARD C63.4-2003 using an Agilent spectrum receiver with pre-selector. The bandwidth (RBW) of the spectrum receiver was 100 kHz up to 1 GHz and 1 MHz above 1 GHz with an appropriate sweep speed. The VBW above 1 GHz was 3 MHz. The analyzer was calibrated in dB above a microvolt at the output of the antenna. The ambient temperature of the UUT was 76° F with a humidity of 55%.

SECTION 4: POWER LINE CONDUCTED EMISSION

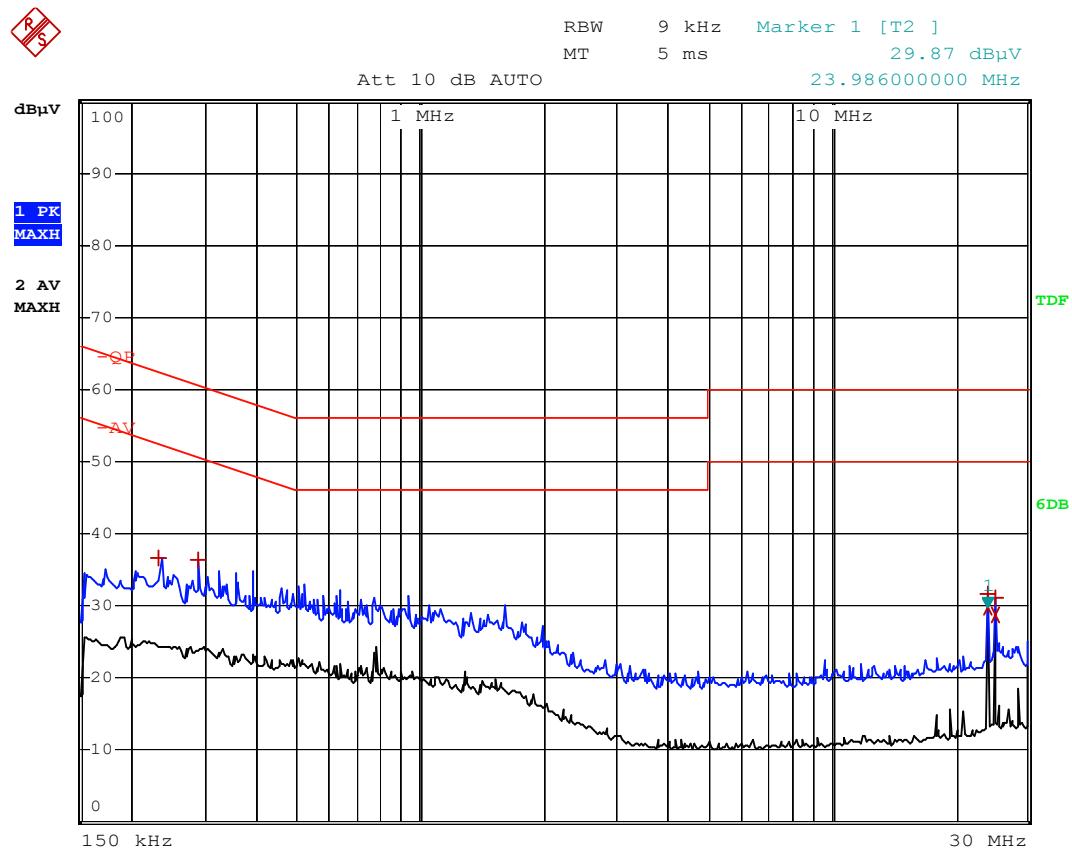
RULES PART NO.: 15.107(a)

REQUIREMENTS:

	QUASI-PEAK	AVERAGE
0.15-0.5 MHz	66-56 dB μ V	56-46 dB μ V
0.5-5.0	56	46
5.0-30.	60	50

TEST PROCEDURE: ANSI C63.4-2003. The spectrum was scanned from .15 to 30MHz.

TEST DATA: LINE 1

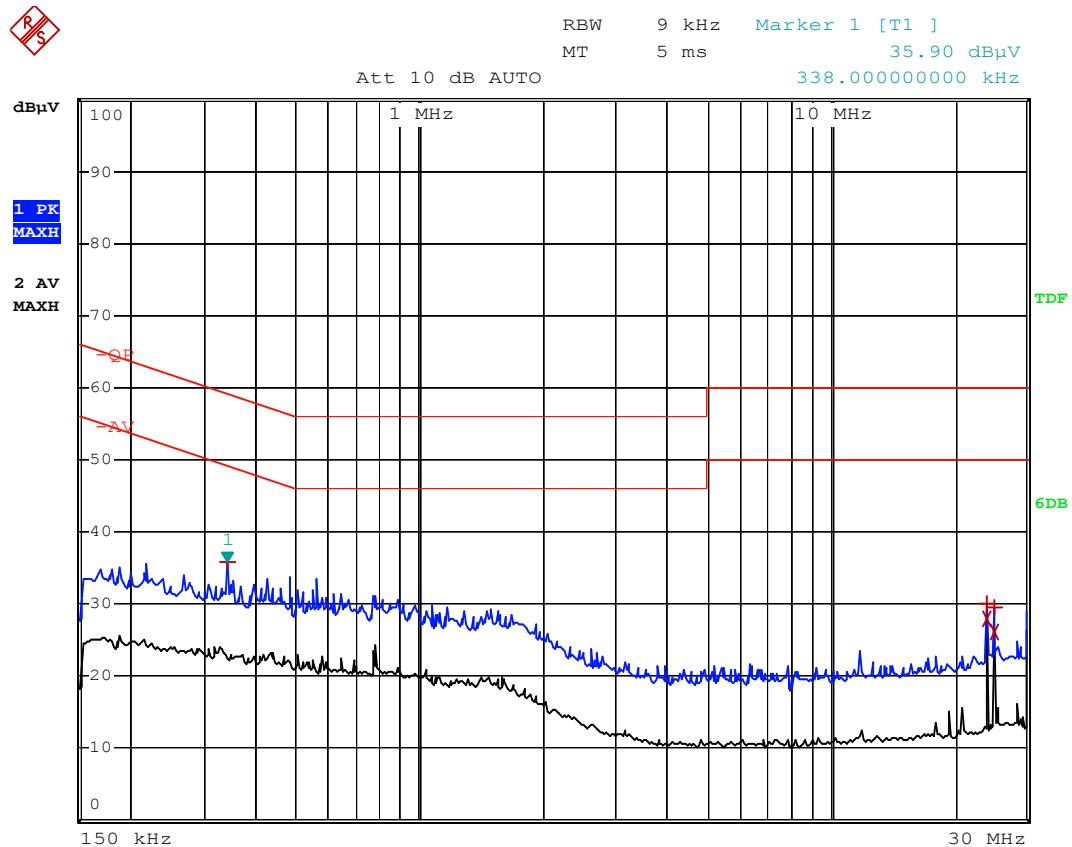


Date: 7.JUL.2010 20:07:53

EDIT PEAK LIST (Prescan Results)				
Trace1:	-QP			
Trace2:	-AV			
Trace3:	---			
TRACE	FREQUENCY	LEVEL dB μ V	DELTA	LIMIT dB
1 Max Peak	234 kHz	36.52	-25.78	
1 Max Peak	286 kHz	36.44	-24.19	
2 Average	23.986 MHz	29.87	-20.12	
1 Max Peak	23.986 MHz	31.65	-28.34	
2 Average	25.002 MHz	28.84	-21.15	
1 Max Peak	25.002 MHz	31.16	-28.83	

Date: 7.JUL.2010 20:08:02

TEST DATA: LINE 2



Date: 7.JUL.2010 20:09:43

EDIT PEAK LIST (Prescan Results)				
Trace1:	-QP			
Trace2:	-AV			
Trace3:	---			
TRACE	FREQUENCY	LEVEL dB μ V	DELTA	LIMIT dB
1 Max Peak	338 kHz	35.90	-23.34	
2 Average	23.986 MHz	28.01	-21.98	
1 Max Peak	23.986 MHz	29.96	-30.03	
1 Max Peak	25.002 MHz	29.51	-30.48	
2 Average	25.002 MHz	26.16	-23.83	

Date: 7.JUL.2010 20:09:51

SECTION 5: NUMBER OF HOPPING CHANNELS

RULES PART NO.: 15.247(a)1

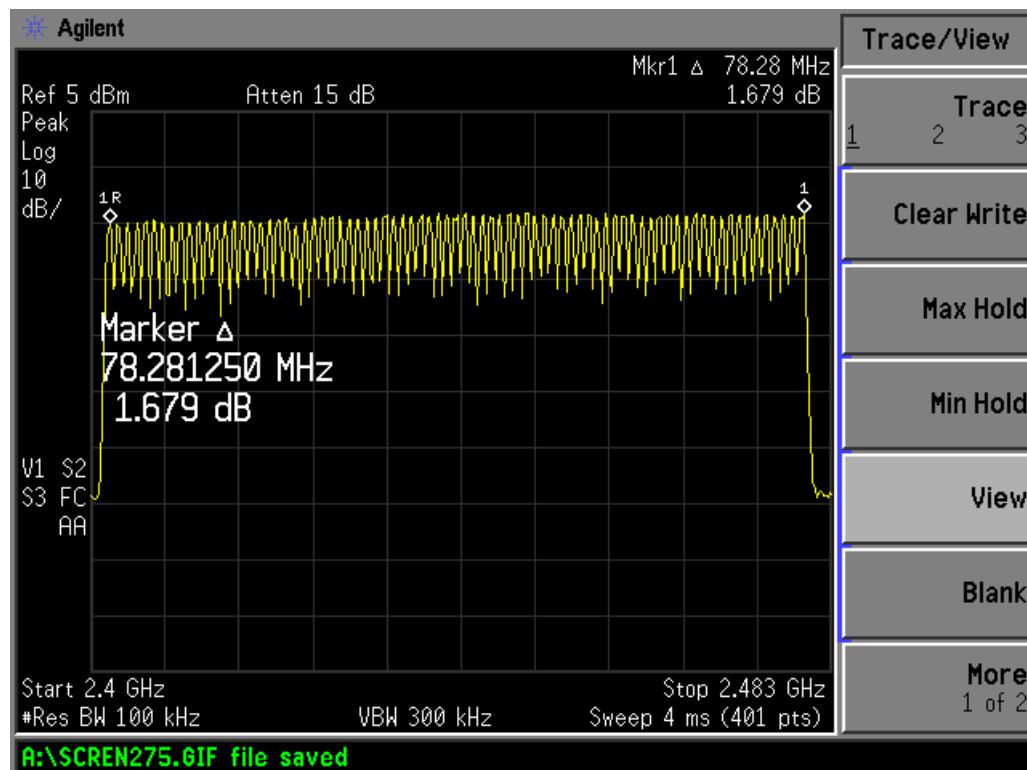
REQUIREMENTS: The number of hops is 79 hops at a separation of 1 MHz, the requirement in the 2400 - 2483.5 MHz band is a minimum of 75 hops.

Measurement Data: Complies

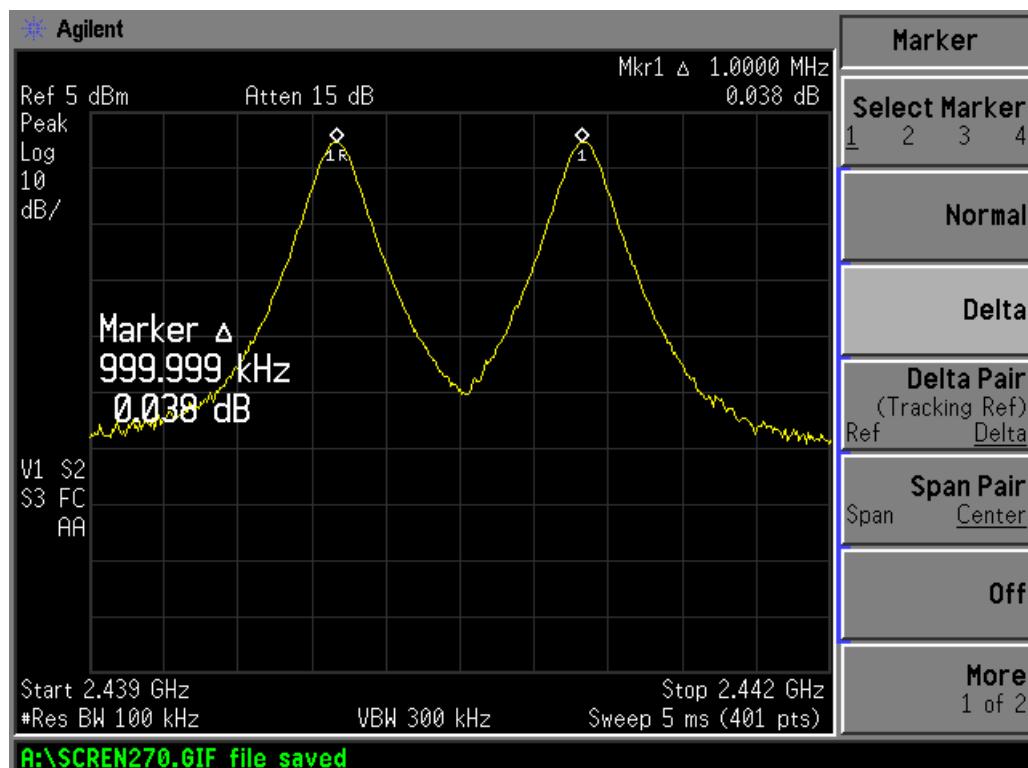
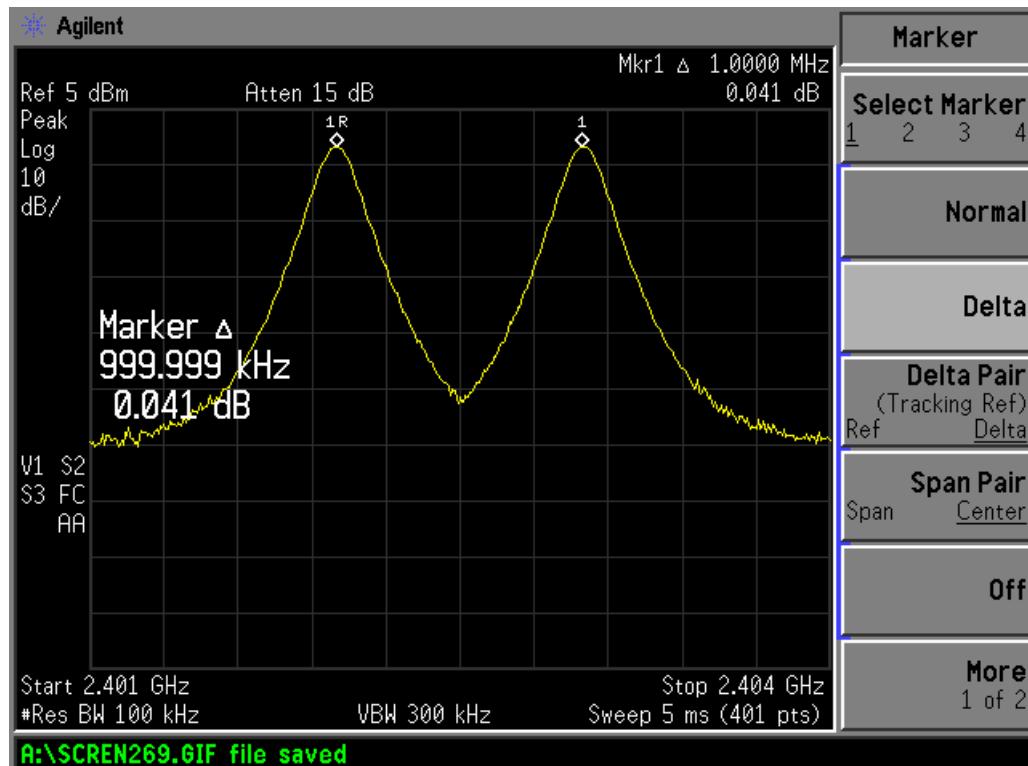
Total number of Hopping Channels: 79

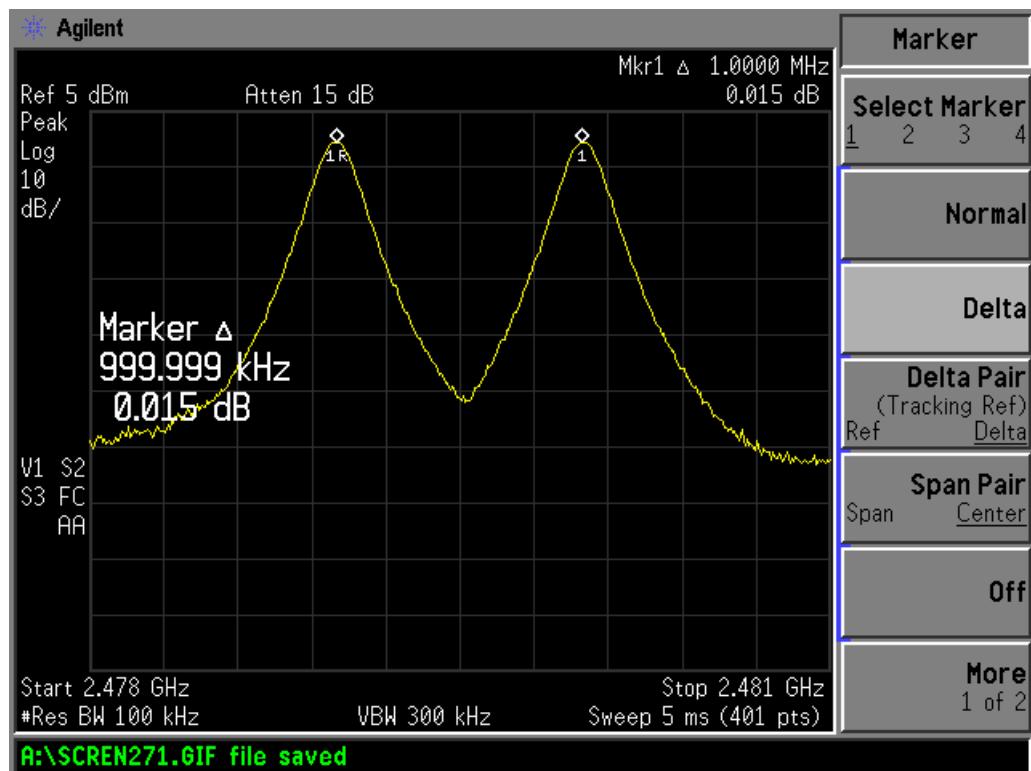
See below for actual measured spectrum plots.

NUMBER OF HOPPING CHANNELS



CHANNEL/CARRIER SPACING

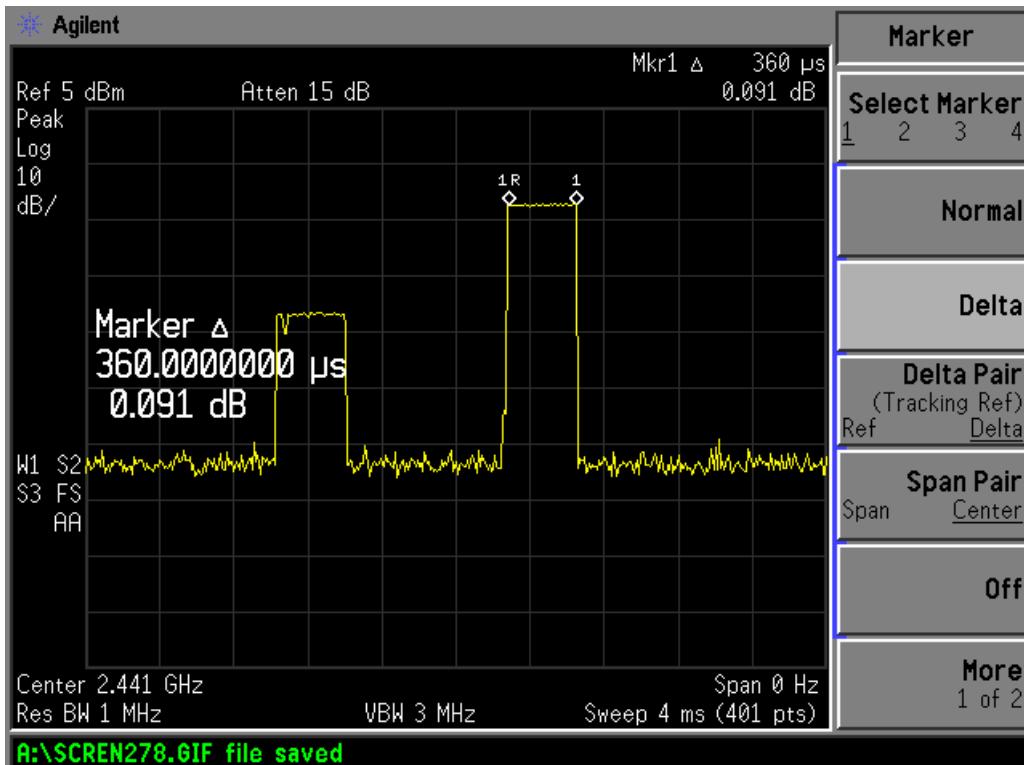
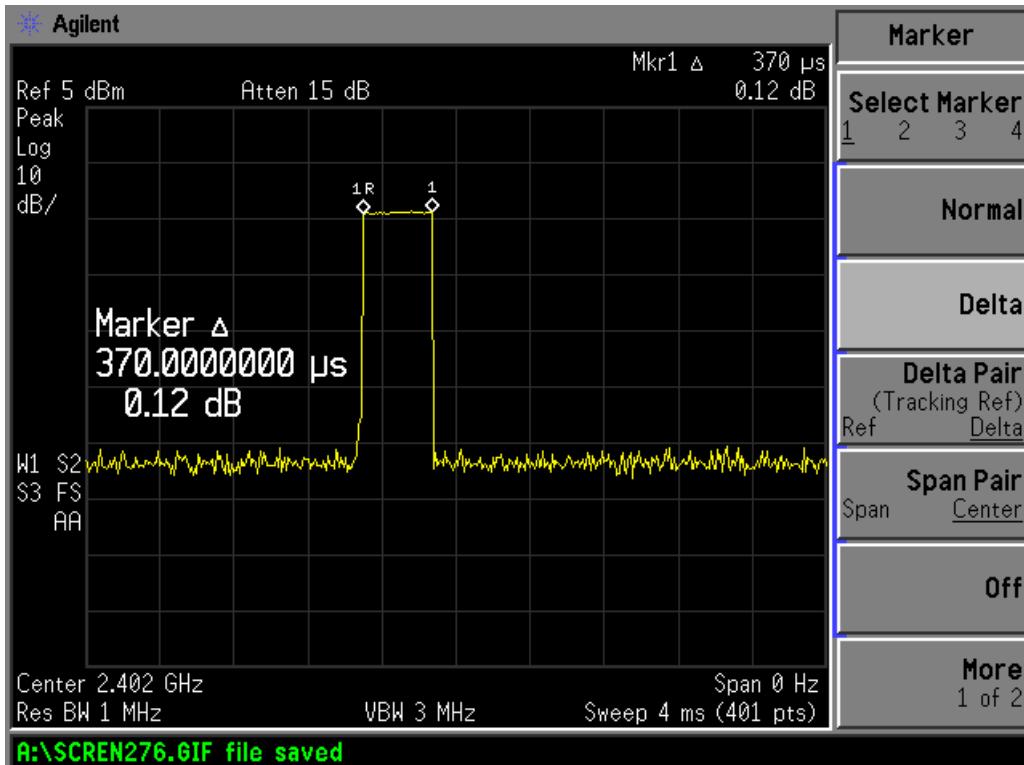


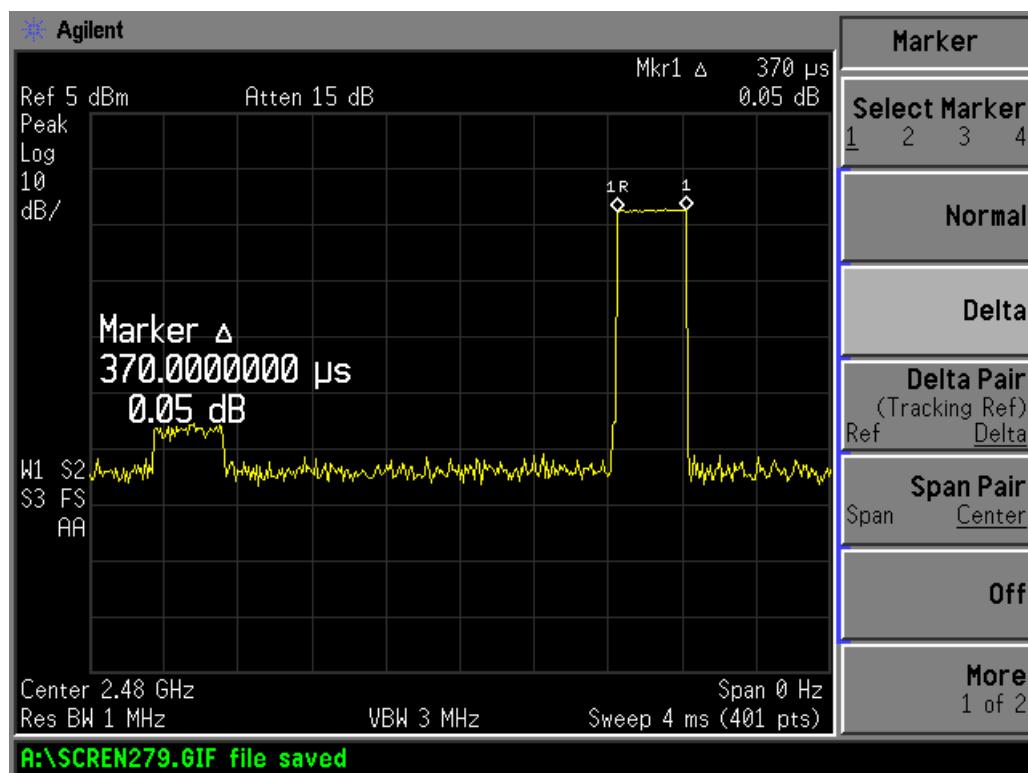


SECTION 6: DWELL TIME OF A HOPPING CHANNEL

RULES PART NO.: 15.247(a)(1)(i)

REQUIREMENTS: The dwell time is 370 μ s at 2.402GHz, 360 μ s at 2.441GHz and 370 μ s at 2.480GHz

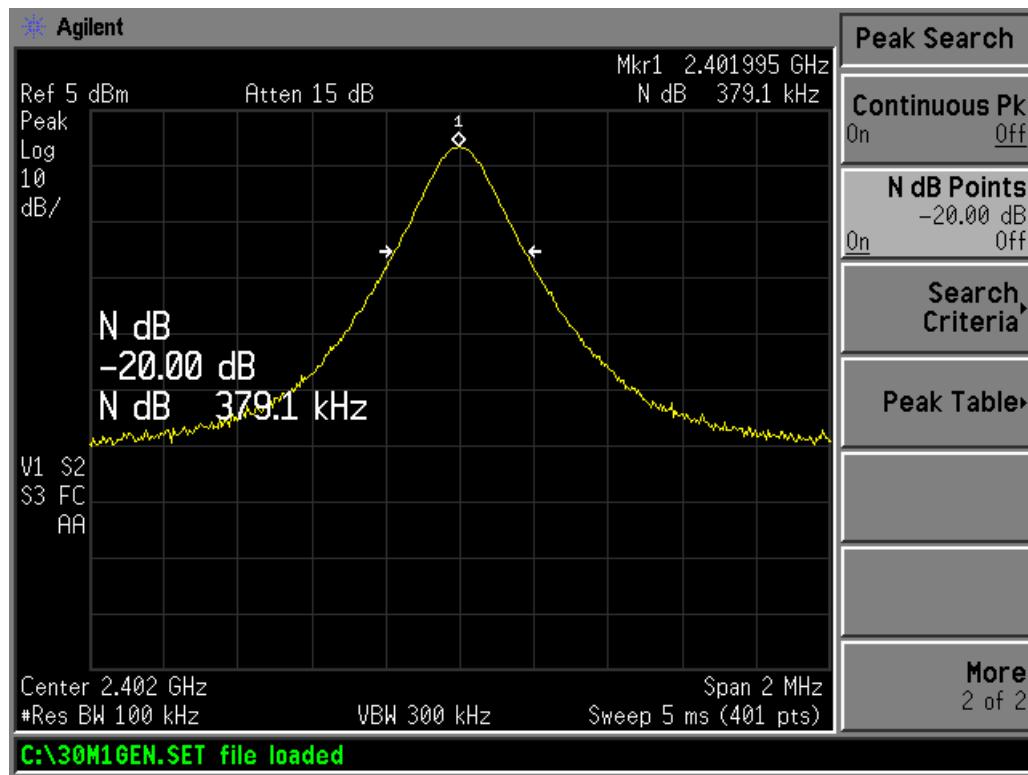




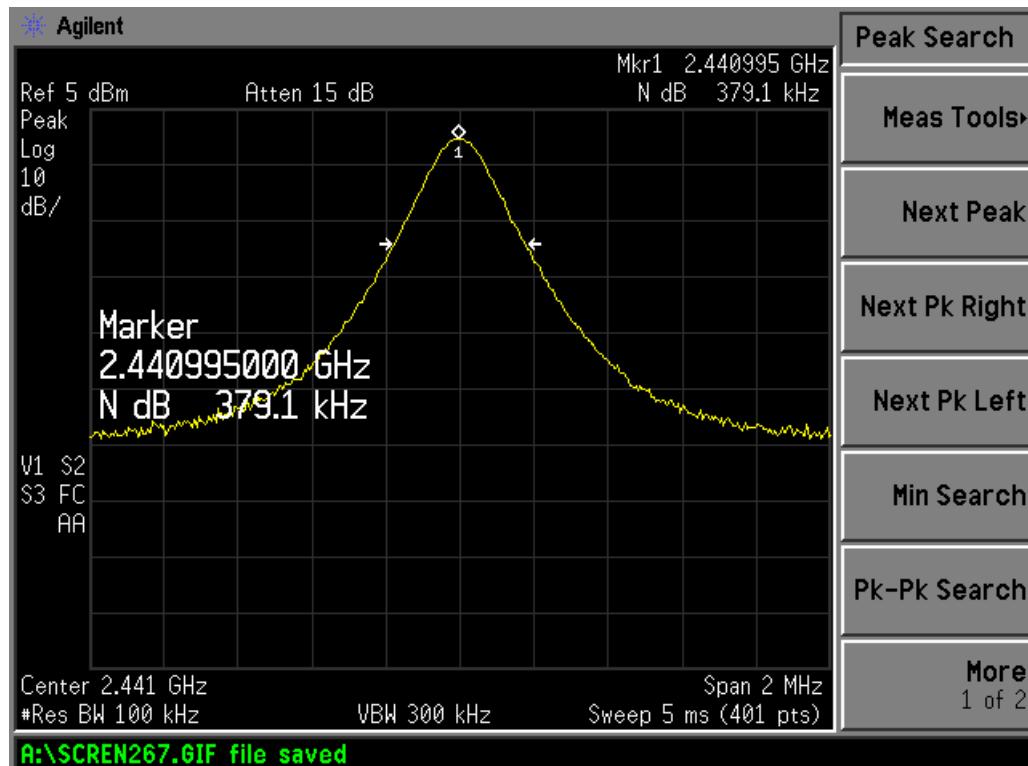
SECTION 7: 20dB BANDWIDTH

RULE PART NO.: 15.247(a)(1)(iii)

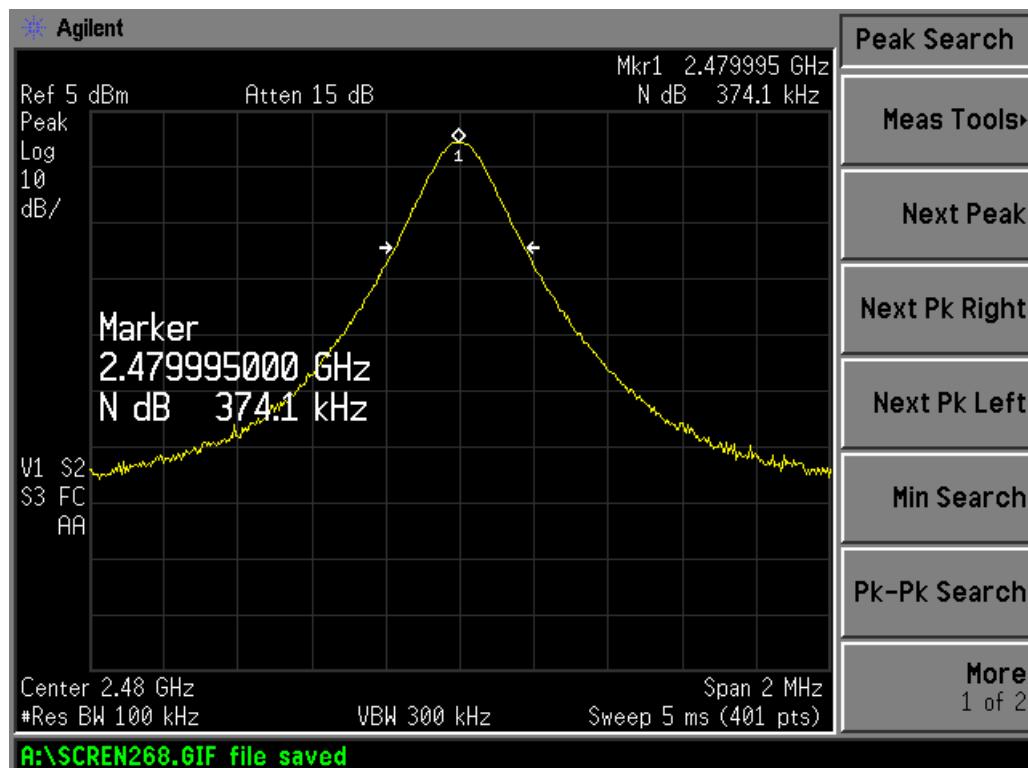
REQUIREMENTS: The 20 dB bandwidth measured was 379.1 kHz at 2.402GHz



REQUIREMENTS: The 20 dB bandwidth measured was 379.1 kHz at 2.441GHz



REQUIREMENTS: The 20 dB bandwidth measured was 374.1 kHz at 2.480GHz



Three places in the band were measured and the worst case presented above.

SECTION 8: POWER OUTPUT

RULE PART NO.: 15.247(b)(1)

REQUIREMENTS: 1.0 Watt or +30 dBm

MEASUREMENT: 2402 MHz 1.421 mW or 0.001421 Watts EIRP
2441 MHz 1.443 mW or 0.001443 Watts EIRP
2480 MHz 1.433 mW or 0.001433 Watts EIRP

Method: 15.247(c)

The device under test has an integral antenna and the power was measured on a radiated basis.

SECTION 9: FIELD STRENGTH OF SPURIOUS EMISSIONS

RULES PART NO.: 15.247(c), 15.205 &15.209(b)

REQUIREMENTS:

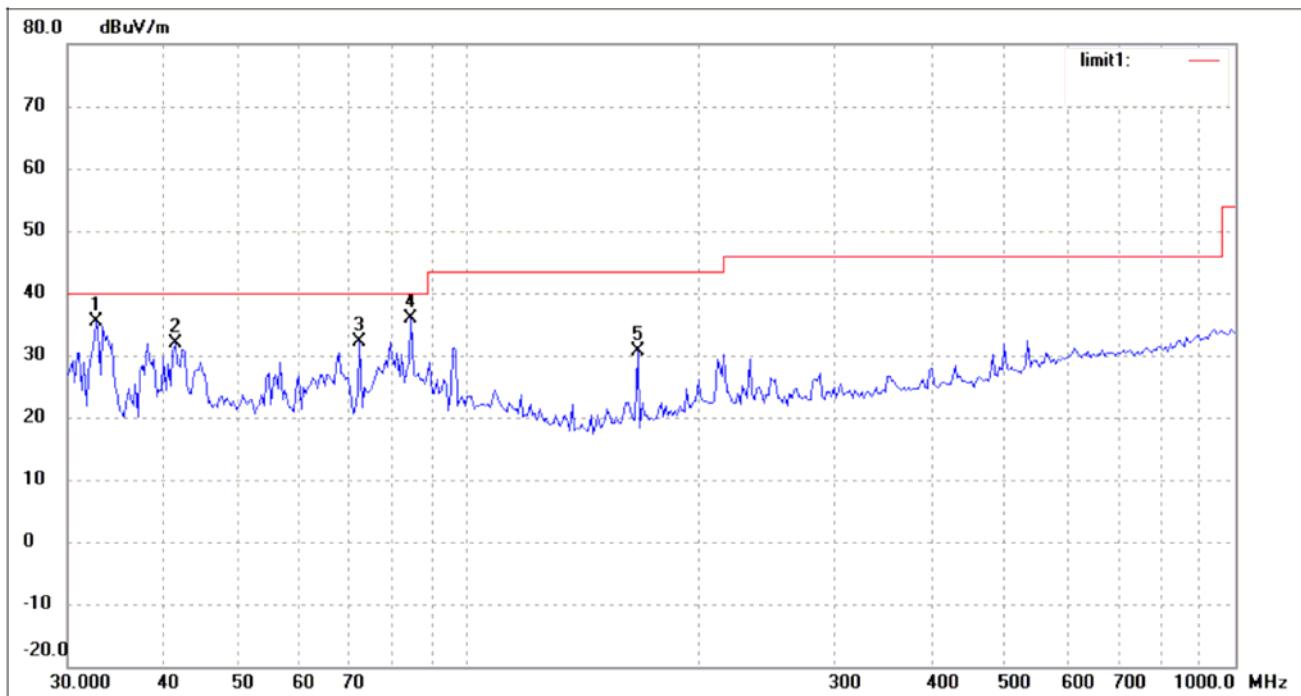
FIELD STRENGTH of Fundamental: 902-928MHz 2.4-2.4835GHz	FIELD STRENGTH of Harmonics 127.37dBuV/m 127.38dBuV/m @3m	S15.209 30 - 88 MHz 40 dBuV/m @3m 88 -216 MHz 43.5 216 -960 MHz 46 ABOVE 960 MHz 54dBuV/m

EMISSIONS RADIATED OUTSIDE OF THE SPECIFIED FREQUENCY BANDS, EXCEPT FOR HARMONICS, SHALL BE ATTENUATED BY AT LEAST 20 dB BELOW THE LEVEL OF THE FUNDAMENTAL OR TO THE GENERAL RADIATED EMISSION LIMITS IN 15.209, WHICHEVER IS THE LESSER ATTENUATION.

Emissions that fall in the restricted bands (15.205) must be less than 54dBuV/m otherwise the spurious and harmonics must be attenuated by at least 20dB.

TEST DATA: 30-1000 MHz see next page

Job No.:	Techtion	Polarization:	Horizontal
Standard:	FCC Class B 3M Radiation	Power Source:	DC 3.3V
Test item:	Radiation Test	Date:	10/07/01/
Temp.(C)/Hum.(%RH):	26(C)/60%RH	Time:	10/34/22
EUT:	Bluetooth	Test By:	
Model:		Distance:	3m
Note:	HIGH CH		



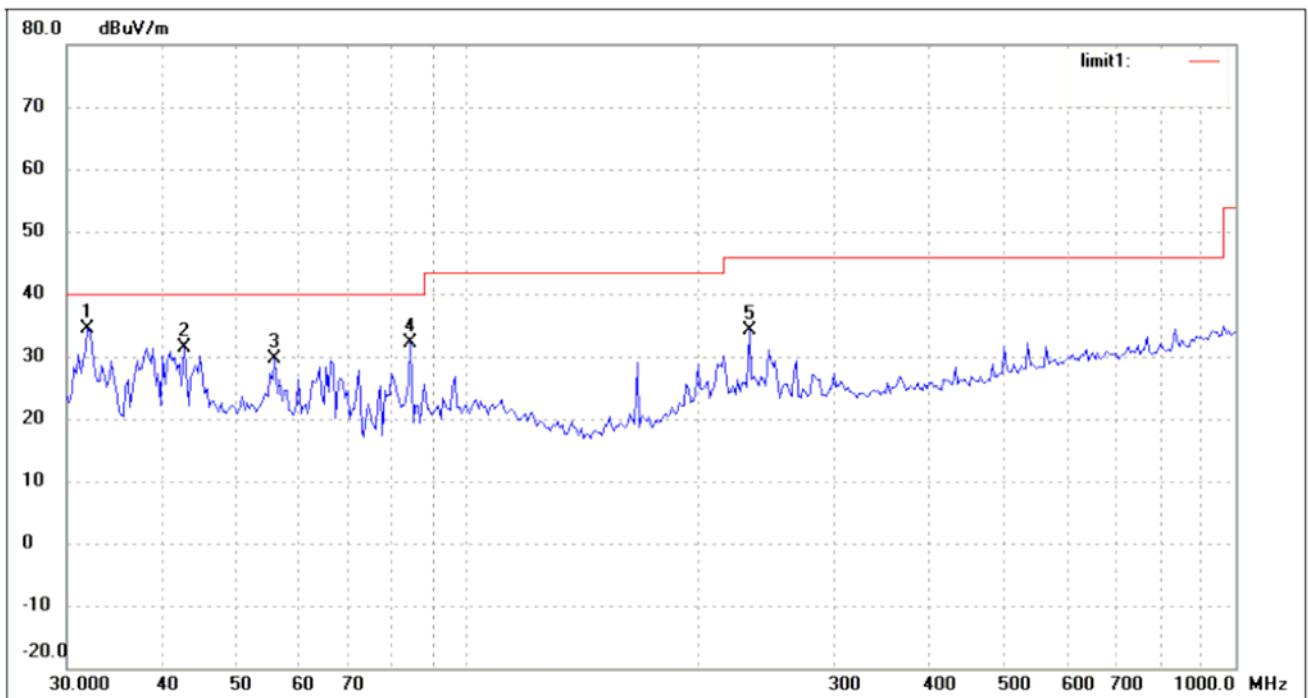
No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	()	(cm)	
1	32.6340	28.76	6.61	35.37	40.00	-4.63			peak
2	41.4215	23.97	7.95	31.92	40.00	-8.08			peak
3	72.0843	29.36	2.87	32.23	40.00	-7.77			peak
4	84.1100	31.22	4.63	35.85	40.00	-4.15			peak
5	166.0680	26.74	3.93	30.67	43.50	-12.83			peak

Job No.:	Techtion	Polarization:	Vertical
Standard:	FCC Class B 3M Radiation	Power Source:	DC 3.3V
Test item:	Radiation Test	Date:	10/07/01/
Temp.(C)/Hum.(%RH):	26(C)/60%RH	Time:	10/35/55
EUT:	Bluetooth	Test By:	
Model:		Distance:	3m
Note:	HIGH CH		



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	()	(cm)	
1	32.1795	32.20	6.62	38.82	40.00	-1.18			QP
2	40.2757	30.25	7.94	38.19	40.00	-1.81			QP
3	51.8430	27.31	7.61	34.92	40.00	-5.08			QP
4	84.1100	28.89	4.63	33.52	40.00	-6.48			peak

Job No.:	Techtion	Polarization:	Horizontal
Standard:	FCC Class B 3M Radiation	Power Source:	DC 3.3V
Test item:	Radiation Test	Date:	10/07/01/
Temp.(C)/Hum.(%RH):	26(C)/60%RH	Time:	10/30/22
EUT:	Bluetooth	Test By:	
Model:		Distance:	3m
Note:	LOW CH		



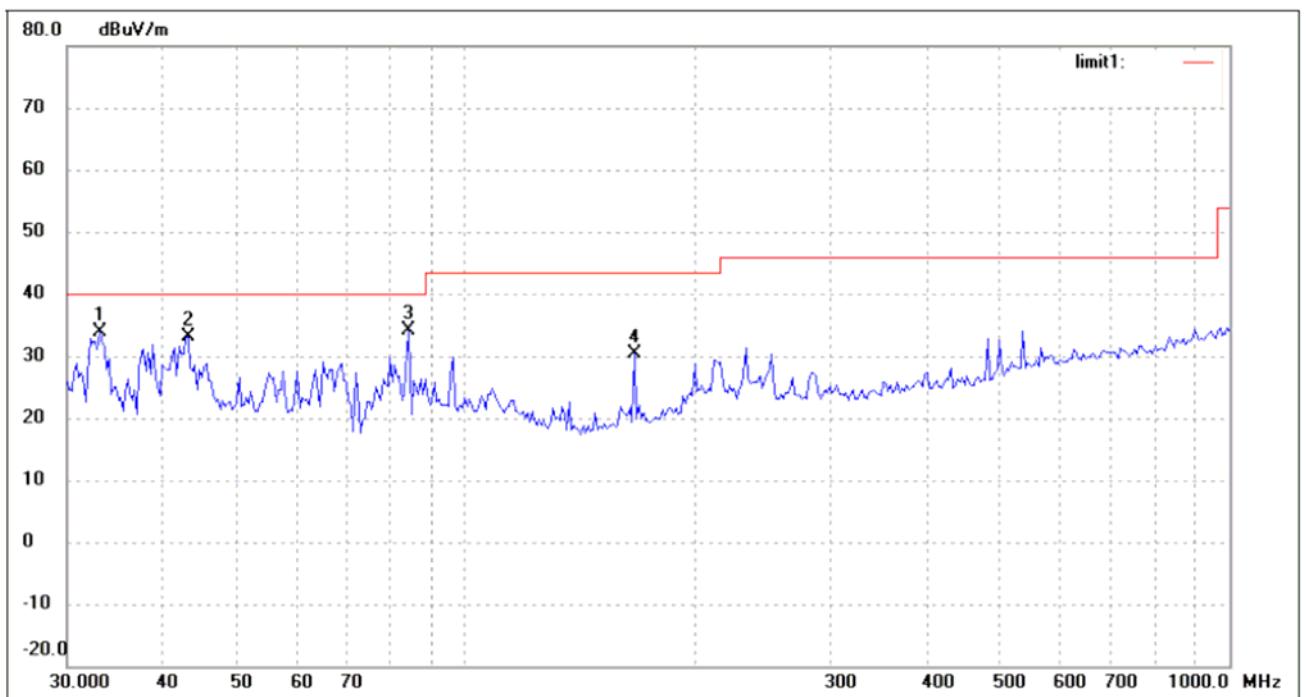
No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	()	(cm)	
1	31.9546	27.70	6.62	34.32	40.00	-5.68			peak
2	42.6000	23.41	7.96	31.37	40.00	-8.63			peak
3	56.0007	22.22	7.41	29.63	40.00	-10.37			peak
4	84.1100	27.53	4.63	32.16	40.00	-7.84			peak
5	232.5318	27.07	7.03	34.10	46.00	-11.90			peak

Job No.:	Tection	Polarization:	Vertical
Standard:	FCC Class B 3M Radiation	Power Source:	DC 3.3V
Test item:	Radiation Test	Date:	10/07/01/
Temp.(C)/Hum.(%RH):	26(C)/60%RH	Time:	10/43/41
EUT:	Bluetooth	Test By:	
Model:		Distance:	3m
Note:	LOW CH		



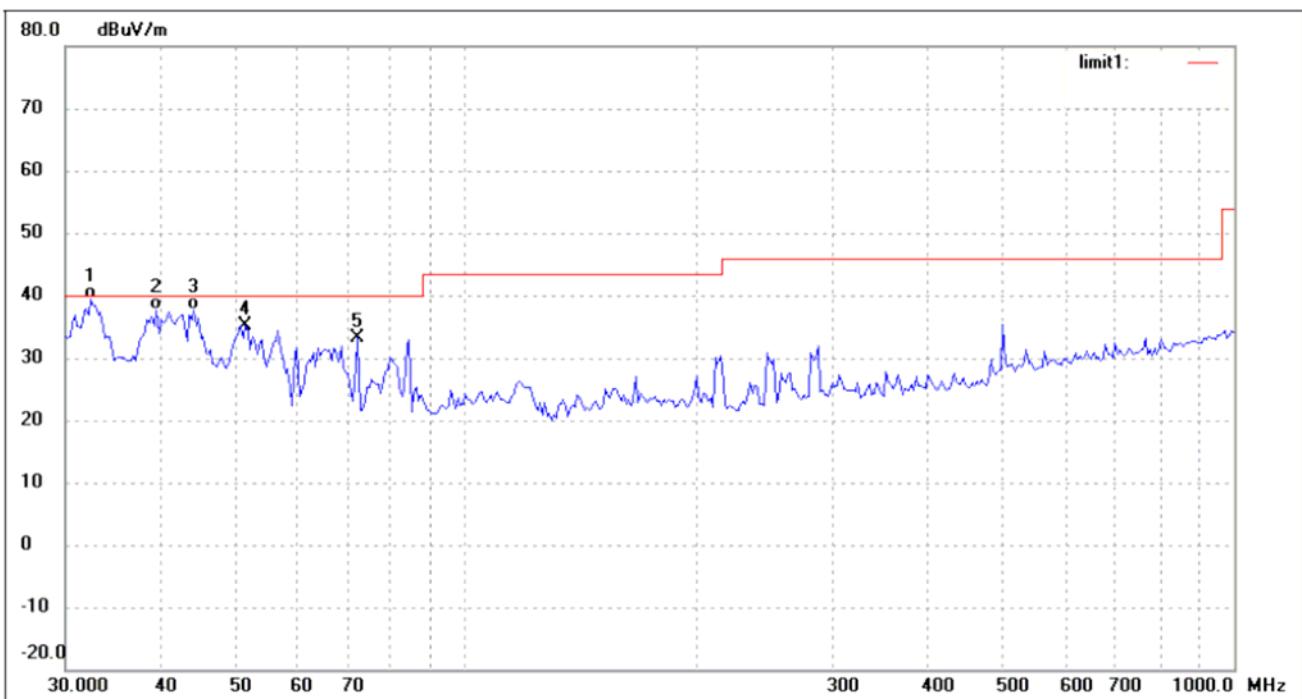
No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dB _u V/m)	dB/m	(dB _u V/m)	(dB _u V/m)	(dB)	()	(cm)	
1	32.4059	32.79	6.62	39.41	40.00	-0.59			QP
2	41.1320	31.05	7.94	38.99	40.00	-1.01			QP
3	51.4807	28.82	7.62	36.44	40.00	-3.56			QP
4	67.6751	29.89	4.13	34.02	40.00	-5.98			peak
5	499.4247	24.79	12.88	37.67	46.00	-8.33			peak

Job No.:	Techtion	Polarization:	Horizontal
Standard:	FCC Class B 3M Radiation	Power Source:	DC 3.3V
Test item:	Radiation Test	Date:	10/07/01/
Temp.(C)/Hum.(%RH):	26(C)/60%RH	Time:	10/32/47
EUT:	Bluetooth	Test By:	
Model:		Distance:	3m
Note:	MIDDLE CH		



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	33.0950	27.19	6.61	33.80	40.00	-6.20			peak
2	43.2017	25.08	7.96	33.04	40.00	-6.96			peak
3	84.1100	29.38	4.63	34.01	40.00	-5.99			peak
4	166.0680	26.52	3.93	30.45	43.50	-13.05			peak

Job No.:	Techtion	Polarization:	Vertical
Standard:	FCC Class B 3M Radiation	Power Source:	DC 3.3V
Test item:	Radiation Test	Date:	10/07/01/
Temp.(^o C)/Hum.(%RH):	26(^o C)/60%RH	Time:	10/41/13
EUT:	Bluetooth	Test By:	
Model:		Distance:	3m
Note:	MIDDLE CH		



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	()	(cm)	
1	32.4059	32.86	6.62	39.48	40.00	-0.52			QP
2	39.4372	29.88	7.78	37.66	40.00	-2.34			QP
3	44.1202	29.63	7.98	37.61	40.00	-2.39			QP
4	51.4807	27.47	7.62	35.09	40.00	-4.91			peak
5	72.0843	30.25	2.87	33.12	40.00	-6.88			peak

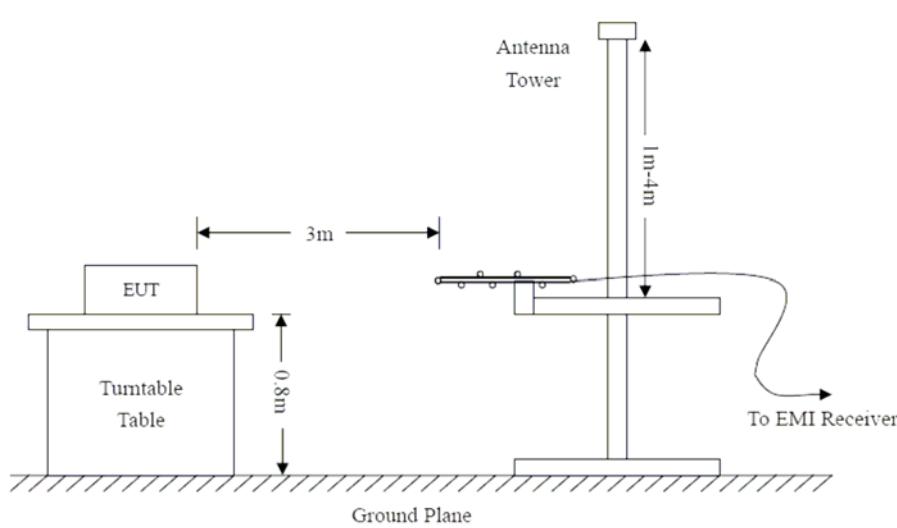
SECTION 10: FIELD STRENGTH OF SPURIOUS EMISSIONS (CONTINUED)

TEST DATA: Above 1000 MHz

Frequency MHz	Detector	Meter Reading dBuV	Direction Degree	Polar H / V	Antenna Loss dB	Cable loss dB	Amplifier dB	Correction Amplitude dBuV/m	Limit dBuV/m	Margin dB
Low Channel (1G to 25GHz)										
4804.0	AV	43.8	66	H	34.1	5.2	33.0	50.1	54	-3.9
4804.0	AV	42.0	135	V	34.1	5.2	33.0	48.3	54	-5.7
7206.0	AV	38.4	45	H	37.4	6.1	33.5	48.4	54	-5.6
7206.0	AV	36.1	60	V	37.4	6.1	33.5	46.1	54	-7.9
2402.0	AV	88.3	45	H	29.1	3.7	34.0	87.1		(Fund.)
2402.0	AV	87.0	98	V	29.1	3.7	34.0	85.8		(Fund.)
4804.0	PK	45.7	56	H	37.4	6.1	33.5	55.7	74	-18.3
4804.0	PK	47.6	60	V	34.1	5.2	33.0	53.9	74	-20.1
7206.0	PK	47.7	266	H	34.1	5.2	33.0	54.0	74	-20.0
7206.0	PK	41.7	185	V	37.4	6.1	33.5	51.7	74	-22.3
2402.0	PK	93.9	90	H	29.1	3.7	34.0	92.7		(Fund.)
2402.0	PK	92.6	43	V	29.1	3.7	34.0	91.4		(Fund.)
Middle Channel (1G to 25GHz)										
4882.0	AV	43.4	145	H	34.1	5.2	33.0	49.7	54	-4.3
4882.0	AV	41.0	65	V	34.1	5.2	33.0	47.3	54	-6.7
7323.0	AV	36.2	142	H	37.4	6.1	33.5	46.2	54	-7.8
7323.0	AV	34.8	22	V	37.4	6.1	33.5	44.8	54	-9.2
2441.0	AV	89.7	242	H	29.1	3.7	34.0	88.5		(Fund.)
2441.0	AV	87.2	113	V	29.1	3.7	34.0	86.0		(Fund.)
4882.0	PK	45.3	25	H	37.4	6.1	33.5	55.3	74	-18.7
4882.0	PK	42.9	55	V	37.4	6.1	33.5	52.9	74	-21.1
7323.0	PK	45.5	14	H	34.1	5.2	33.0	51.8	74	-22.2
7323.0	PK	44.1	0	V	34.1	5.2	33.0	50.4	74	-23.6
2441.0	PK	95.3	90	H	29.1	3.7	34.0	94.1		(Fund.)
2441.0	PK	92.8	55	V	29.1	3.7	34.0	91.6		(Fund.)

High Channel (1G to 25GHz)											
4960.0	AV	36.8	87	H	37.4	6.1	33.5	46.8	54	-7.2	
4960.0	AV	34.7	26	V	37.4	6.1	33.5	44.7	54	-9.3	
7440.0	AV	42.5	251	H	34.1	5.2	33.0	48.8	54	-5.2	
7440.0	AV	40.2	66	V	34.1	5.2	33.0	46.5	54	-7.5	
2480.0	AV	89.1	315	H	29.1	3.7	34.0	87.9			(Fund.)
2480.0	AV	87.6	108	V	29.1	3.7	34.0	86.4			(Fund.)
4960.0	PK	46.1	55	H	34.1	5.2	33.0	52.4	74	-21.6	
4960.0	PK	44.0	102	V	34.1	5.2	33.0	50.3	74	-23.7	
7440.0	PK	44.4	269	H	37.4	6.1	33.5	54.4	74	-19.6	
7440.0	PK	42.1	103	V	37.4	6.1	33.5	52.1	74	-21.9	
2480.0	PK	94.7	157	H	29.1	3.7	34.0	93.5			(Fund.)
2480.0	PK	93.2	55	V	29.1	3.7	34.0	92.0			(Fund.)

Method of Measuring Radiated Spurious Emissions



Equipment placed 80cm above ground on a rotatable platform.

METHOD OF MEASUREMENT: The procedure used was ANSI STANDARD C63.4-2003 & the FCC/OET Guidance on Measurements for Direct Sequence Spread Spectrum Systems - Public Notice 54797 Dated July 12, 1995.

SECTION 11: RADIATED SPURIOUS EMISSIONS INTO ADJACENT RESTRICTED BAND

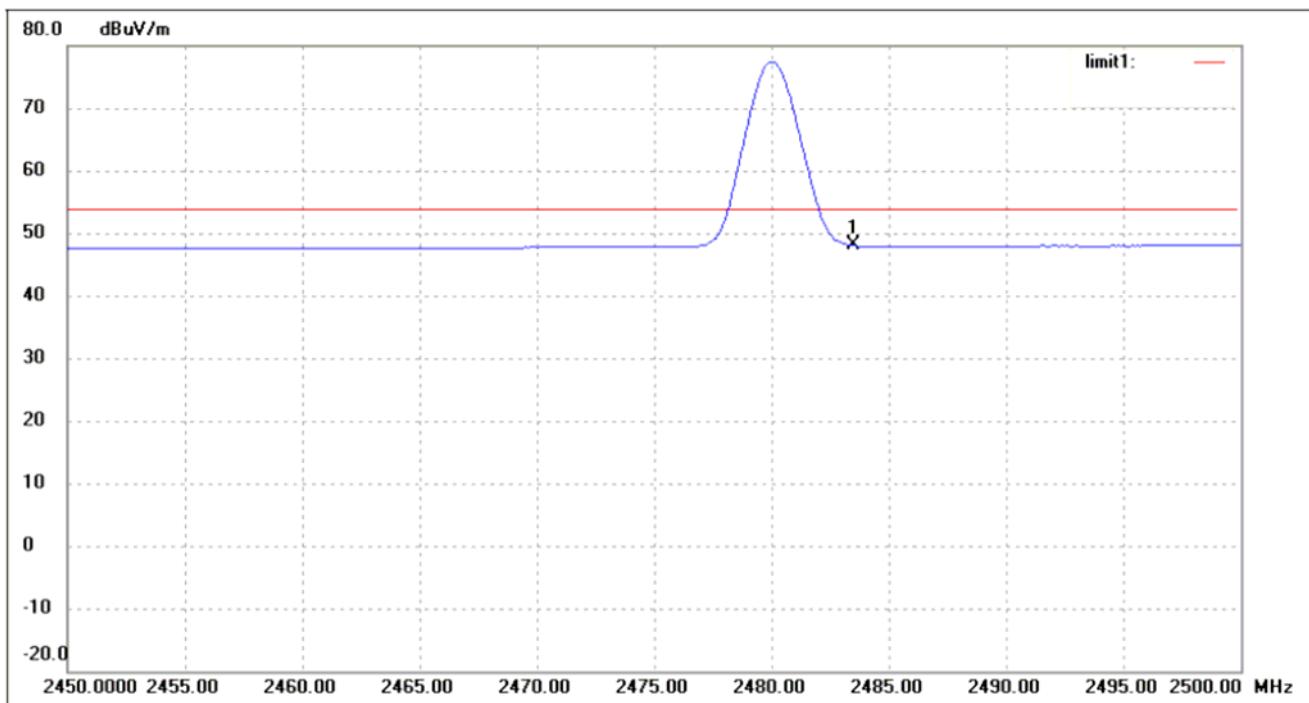
RULE PART NO.: 15.205

REQUIREMENTS: Emissions that fall in the restricted bands (15.205). These emissions must be less than or equal to 500 uV/m (54 dBuV/m).

TEST PROCEDURE: An in band field strength measurement of the fundamental Emission using the RBW and detector function required by C63.4-2003 and FCC Rules. The procedure was repeated with an average detector and a plot made. The calculated field strength in the adjacent restricted band is presented below.

Highest Bandedge

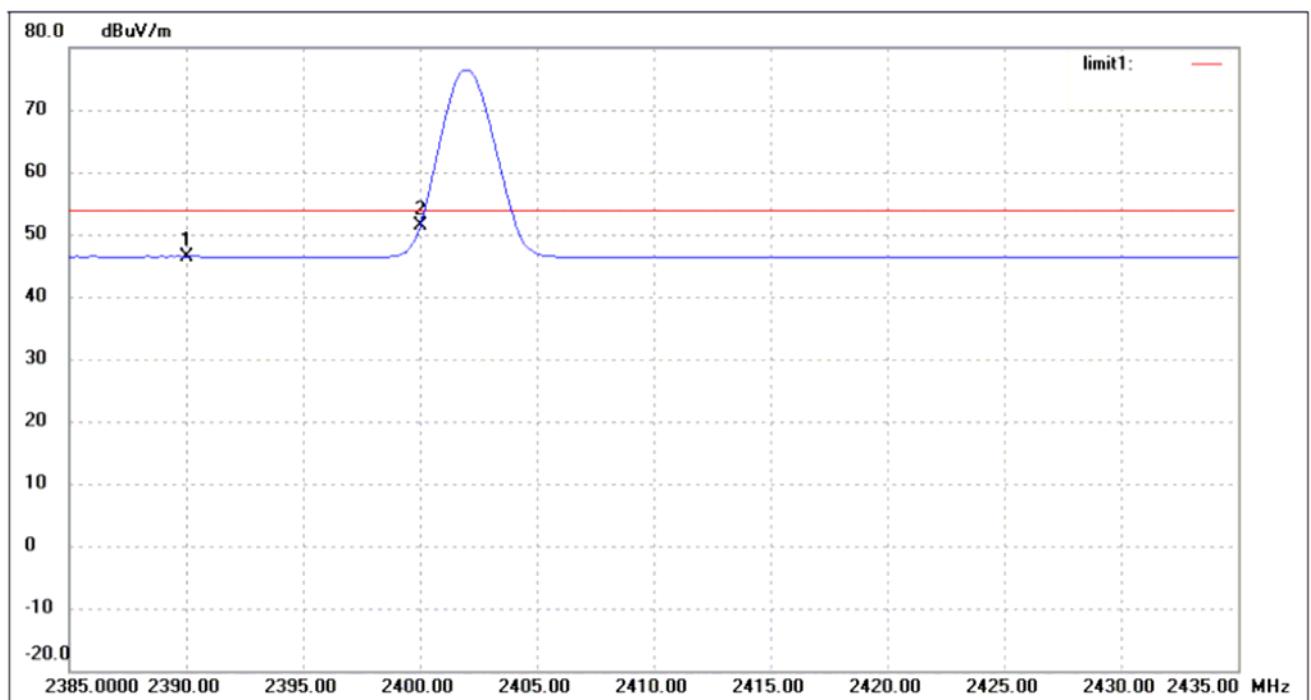
Job No.:	Techtion	Polarization:	Horizontal
Standard:	FCC Part15C Above 1G	Power Source:	DC 3.3V
Test item:	Radiation Test	Date:	10/07/01/
Temp.(C)	26(C)/60%RH	Time:	10/52/59
C)/Hum.(%RH):			
EUT:	Bluetooth	Test By:	
Model:		Distance:	3m
Note:	HIGHEST CH		



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	2483.500	12.06	35.97	48.03	54.00	-5.97			AVE

Lowest Bandedge

Job No.:	Techtion	Polarization:	Horizontal
Standard:	FCC Part15C Above 1G	Power Source:	DC 3.3V
Test item:	Radiation Test	Date:	10/07/01/
Temp.(C)/Hum.(%RH):	26(C)/60%RH	Time:	10/50/21
EUT:	Bluetooth	Test By:	
Model:		Distance:	3m
Note:	LOWEST CH		



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	()	(cm)	
1	2390.000	11.90	34.59	46.49	54.00	-7.51			AVE
2	2400.000	16.71	34.68	51.39	54.00	-2.61			AVE