SGS-CSTC Standards Technical Services
(Shanghai) Co., Ltd.

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1 Cover Page

FCC Part 15C TEST REPORT

Application No.:	SHEM1501000160CR
Applicant:	Ninebot Inc
FCC ID:	2ABUDMODELE
Equipment Under Test (EUT): **NOTE:** The following sample(s) submitted was/were identified on behalf of the client as	
Product Name:	Ninebot one
Model No.(EUT):	Model E
Add Model No.:	Model C
Standards:	FCC PART 15 Subpart C: 2014
Date of Receipt:	January 19, 2015
Date of Test:	February 12, 2015
Date of Issue:	March 16, 2015
Test Result:	**Pass***

*In the configuration tested, the EUT detailed in this report complied with the standards specified above.

Tony Wu
E&E Section Manager
SGS-CSTC (Shanghai) Co., Ltd.

2 Version

Revision Record				
Version	**Chapter**	**Date**	**Modifier**	**Remark**
00	/	March 16, 2015	/	Original

Authorized for issue by:				
Engineer		Eddy Zong **Print Name**		
Clerk		Susie Liu **Print Name**		
Reviewer		Keny Xu **Print Name**		

3 Test Summary

Test Item	Test Requirement	Test method	Result
Antenna Requirement	FCC Part 15, Subpart C Section 15.203/15.247 (c)	---	PASS
AC Power Line Conducted Emission	FCC Part 15, Subpart C Section 15.207	ANSI C63.10 (2013) Section 6.2	N/A
Minimum 6dB Bandwidth	FCC Part 15, Subpart C Section 15.247 (a)(2)	ANSI C63.10 (2013) Section 11.8.1	PASS
Conducted Peak Output Power	FCC Part 15, Subpart C Section 15.247 (b)(3)	ANSI C63.10 (2013) Section 11.9.1.2	PASS
Power Spectrum Density	FCC Part 15, Subpart C Section 15.247 (e)	ANSI C63.10 (2013) Section 11.10.2	PASS
RF Conducted Spurious Emissions and Band-edge	FCC Part 15, Subpart C Section 15.247(d)	ANSI C63.10 (2013) Section 11.12.2.4	PASS
Radiated Spurious emissions and Band-edge	FCC Part 15, Subpart C Section 15.209/15.205	ANSI C63.10 (2013) Section 4&6.5&6.6&6.10	PASS

Note: There are 2 models mentioned in this report, and they are the similar in electrical and electronic characters. Only the model Model E was tested since their difference was cruse range.

4 Contents

5 General Information

5.1 Client Information

Applicant:	Ninebot Inc
Address of Applicant:	No.11, Tianrui Road Auto Spare part Park, Wuqing Diatrict, Tianjin City, China.
Manufacturer:	Ninebot Inc
Address of Manufacturer:	No.11, Tianrui Road Auto Spare part Park, Wuqing Diatrict, Tianjin City, China.
Factory:	Ninebot Inc
Address of Factory:	No.11, Tianrui Road Auto Spare part Park, Wuqing Diatrict, Tianjin City, China.

5.2 General Description of E.U.T.

Product Description:	Mobile Product with BT function	
Brand Name:	Ninebot	
Rechargeable Batteries:	DC 55.5V Li-on Rechargeable Battery, 240Wh Supply the EUT with fully charged battery during the testing.	
Adapter:	Model No.:	XVE-6100190
	Rated Input:	AC 100V-240V 50-60Hz 2.5A
	Rated Output:	DC 61V 1.9A
	Cable length:	AC port: 150cm (2 wires)
		DC port: 150cm

5.3 Technical Specifications

Operation Frequency:	2402MHz-2480MHz
Bluetooth Version:	BT 4.0
Modulation Type:	GFSK
Number of Channel:	40
Antenna Type	Integral PCB Antenna
Antenna Gain	2dBi

5.4 Description of Support Units

The EUT has been tested independently, or The EUT has been tested with associated equipment below.

Description	Manufacturer	Model No.	Supplied by
Laptop	Lenovo	ThinkPad X100e	SGS
BT test board	/	/	Client

Software Name	Manufacturer	Version	Supplied by
Bluetooth	/	1.0.0.0	Client

5.1 Test Mode

Test Mode	Description of Test Mode
Engineering mode	Using test software was control EUT work in continuous transmitter and select channel and modulation type

5.2 Details of Test Channel

Using test software was control EUT work in continuous transmitting mode. And select test channel as below:

Channel	Frequency (MHz)
Low Channel	2402
Middle Channel	2440
High Channel	2480

5.3 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. E&E Lab

No.588 West Jindu Road, Songjiang District, Shanghai, China. 201612.

Tel: +86 21 6191 5666

Fax: +86 21 6191 5678

No tests were sub-contracted.

5.4 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. Date of expiry: 2017-07-14.

- **FCC – Registration No.: 402683**

  SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered and fully described in a report filed with the Federal Communications Commission (FCC). The acceptance letter from the FCC is maintained in our files. Registration No.: 402683, Expiry Date: 2017-09-16.

- **Industry Canada (IC) – IC Assigned Code: 8617A**

  The 3m Semi-anechoic chamber of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 8617A-1. Expiry Date: 2017-06-18.

- **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-3868 and C-4336 respectively. Date of Registration: 2012-05-29. Date of Expiry: 2015-05-28.

5.5 Measurement Uncertainty

No.	Parameter	Measurement Uncertainty
1	Radio Frequency	< ±1 x 10^{-5}
2	Total RF power, conducted	< ±1.5 dB
3	RF power density, conducted	< ±3 dB
4	Spurious emissions, conducted	< ±3 dB
5	All emissions, radiated	< ±6 dB (30MHz – 1GHz) < ±6 dB (above 1GHz)
6	Temperature	< ±1°C
7	Humidity	< ±5 %
8	DC and low frequency voltages	< ±3 %

6 Equipments List

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due date
1	EMI test receiver	Rohde & Schwarz	ESCS30	100086	2015-01-22	2016-01-21
2	Line impedance stabilization network	SCHWARZBECK	NSLK8127	8127490	2015-01-22	2016-01-21
3	Line impedance stabilization network	ETS	3816/2	00034161	2015-01-22	2016-01-21
4	Spectrum Analyzer	Rohde & Schwarz	FSP-30	2705121009	2015-01-22	2016-01-21
5	EMI test receiver	Rohde & Schwarz	ESU40	100109	2015-02-13	2016-02-12
6	Active Loop Antenna (9kHz to 30MHz)	Schwarzbeck - Mess-Elektronik	FMZB 1519	1519-034	2015-02-07	2016-02-06
7	Broadband UHF-VHF ANTENNA (25MHz to 2GHz)	SCHWARZBECK	VULB9168	9168-313	2015-02-07	2016-02-06
8	Ultra broadband antenna (25MHz to3GHz)	Rohde & Schwarz	HL562	100227	2014-08-30	2015-08-29
9	Horn Antenna (1GHz to 18GHz)	Rohde & Schwarz	HF906	100284	2015-02-07	2016-02-06
10	Horn Antenna (1GHz to 18GHz)	SCHWARZBECK	BBHA9120D	9120D-679	2015-02-07	2016-02-06
11	Horn Antenna (14GHz to 40GHz)	SCHWARZBECK	BBHA 9170	BBHA9170373	2015-02-13	2016-02-12
12	Pre-amplifier (9KHz – 2GHz)	LNA6900	TESEQ	71033	2014-12-27	2015-12-27
13	Pre-amplifier (1GHz – 26.5GHz)	Rohde & Schwarz	SCU-F0118-G40-BZ4-CSS(F)	10001	2015-01-22	2016-01-21
14	Pre-amplifier (14GHz – 40GHz)	Rohde & Schwarz	SCU-F1840-G35-BZ3-CSS(F)	10001	2015-01-22	2016-01-21
15	Tunable Notch Filter	Wainwright instruments Gmbh	WRCT800.0/880.0-0.2/40-5SSK	9170397	/	/
16	High pass Filter	FSCW	HP 12/2800-5AA2	19A45-02	/	/
17	High-low temperature cabinet	Suzhou Zhihe	TL-40	50110050	2014-09-11	2015-09-10
18	AC power stabilizer	WOCEN	6100	51122	2015-01-02	2016-01-01
19	DC power	QJE	QJ30003SII	611145	2015-01-02	2016-01-01
20	Signal Generator (Interferer)	Agilent	SMR40	100555	2014-08-10	2015-08-09
21	Signal Generator (Blocker)	Rohde & Schwarz	SMJ100A	02.20.360.142	2015-01-22	2016-01-21
22	Splitter	Anritsu	MA1612A	M12265	/	/
23	Coupler	e-meca	803-S-1	900-M01	/	/

7 Antenna Requirement

7.1 E.U.T. test conditions

Test Power: DC 55.5V

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 -25 °C
Humidity:	35-75 % RH
Atmospheric Pressure:	99.2 -102 kPa

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: 39 channel (2440MHz) and highest channel: 78 channel (2480MHz) with fixed at channel.

7.2 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.

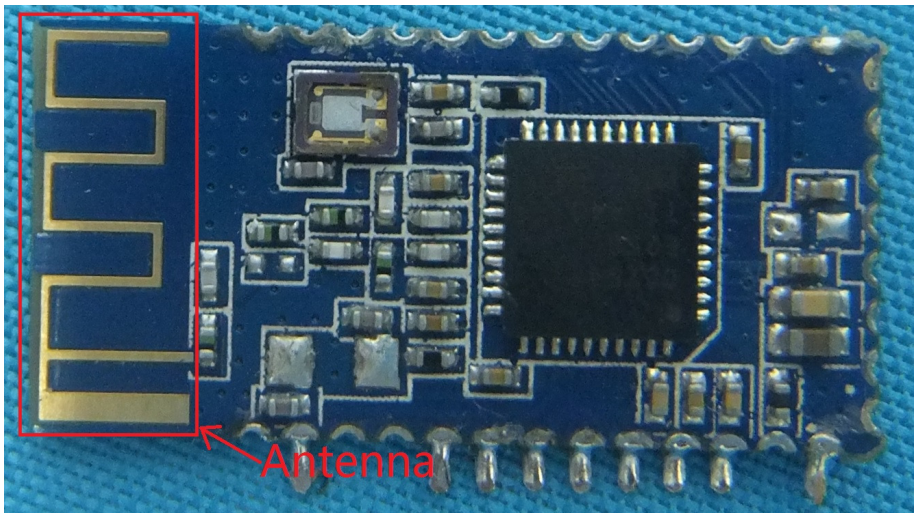
15.247(b) (4) requirement:

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 integrated on the main PCB and no consideration of replacement. The gain of the antenna is less than 2 dBi.

Antenna Configuration:



7.3 Conducted Emissions on Mains Terminals

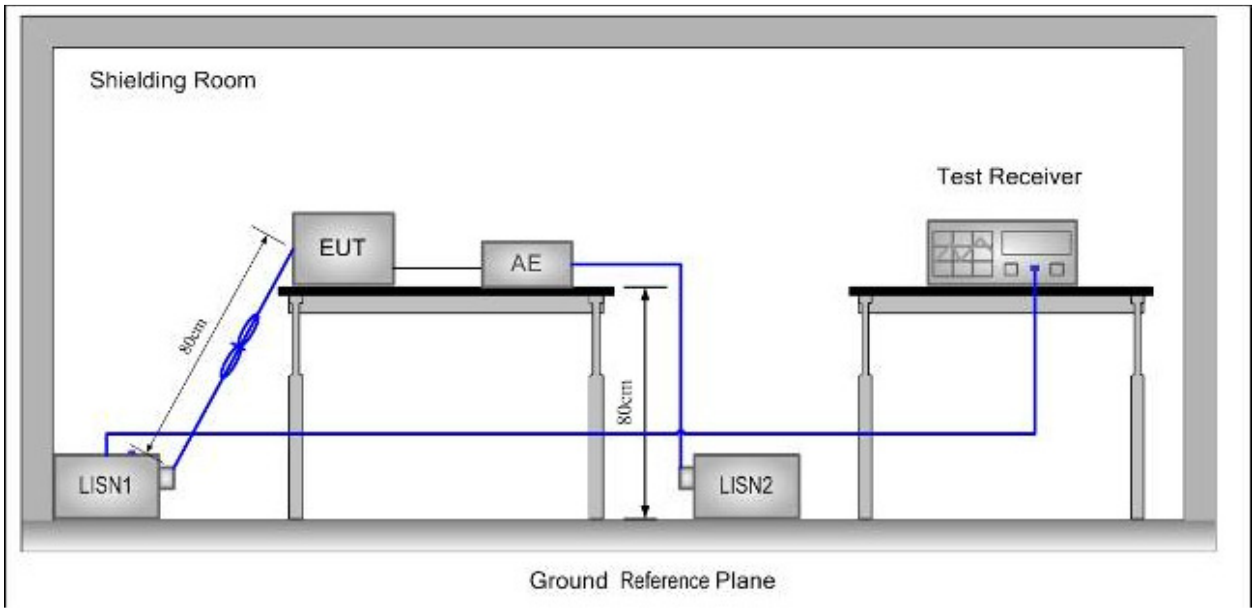
Frequency Range: 150 KHz to 30 MHz

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 Setup:



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

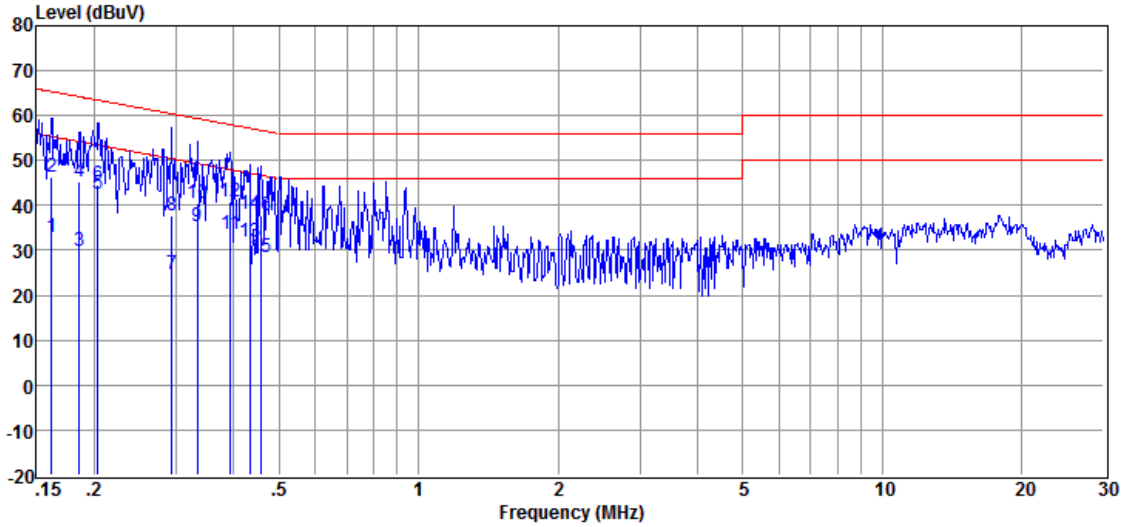
under test and bonded to a ground reference plane for LISN mounted on top of the ground reference plane. This distance was between the closest points of the LISN and the EUT. The mains lead of EUT excess 0.8m was folded back and forth parallel to the lead so as to form a horizontal bundle with a length 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. Pretest under all modes; choose the worst case mode (in Middle channel) record on the report. Please see the attached Quasi-peak and Average test results.

Test Result: PASS

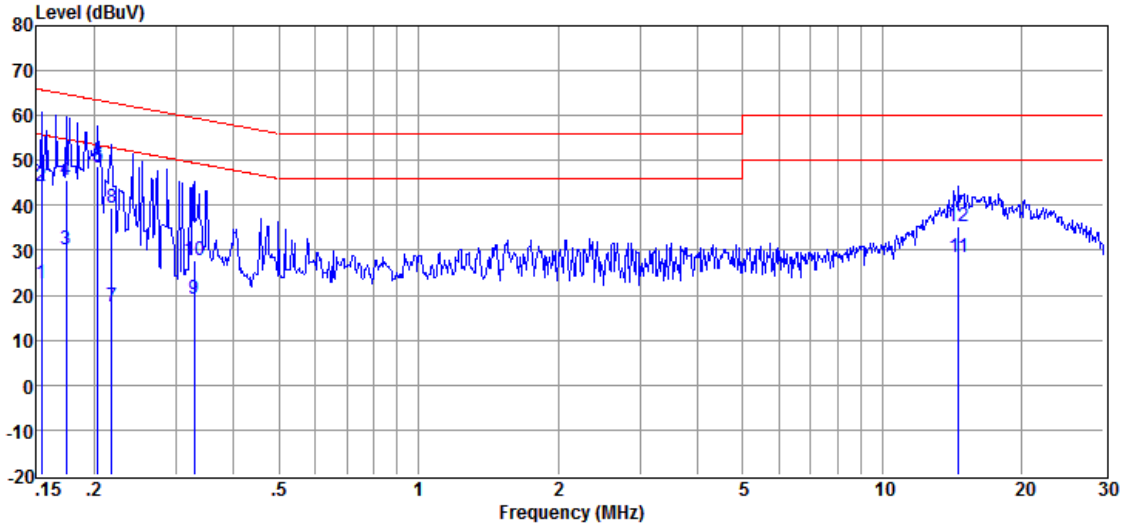
Test Data:

Live Line:



Item	Freq.	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Detector
(Mark)	(MHz)	(dBµV)	(dB)	(dB)	(dBµV)	(dBµV)	(dB)	
1	0.162	32.37	0.31	0.10	32.78	55.38	-22.60	Average
2	0.162	45.88	0.31	0.10	46.29	65.38	-19.09	QP
3	0.185	29.49	0.28	0.10	29.87	54.24	-24.37	Average
4	0.185	44.92	0.28	0.10	45.30	64.24	-18.94	QP
5	0.204	42.10	0.26	0.10	42.46	53.45	-10.99	Average
6	0.204	44.25	0.26	0.10	44.61	63.45	-18.84	QP
7	0.294	24.29	0.26	0.10	24.65	50.41	-25.76	Average
8	0.294	37.23	0.26	0.10	37.59	60.41	-22.82	QP
9	0.334	34.92	0.25	0.10	35.27	49.35	-14.08	Average
10	0.334	40.24	0.25	0.10	40.59	59.35	-18.76	QP
11	0.393	33.16	0.25	0.10	33.51	47.99	-14.48	Average
12	0.393	40.64	0.25	0.10	40.99	57.99	-17.00	QP
13	0.433	31.58	0.25	0.10	31.93	47.20	-15.27	Average
14	0.433	37.65	0.25	0.10	38.00	57.20	-19.20	QP
15	0.456	27.98	0.25	0.10	28.33	46.76	-18.43	Average
16	0.456	37.27	0.25	0.10	37.62	56.76	-19.14	QP

Neutral Line:

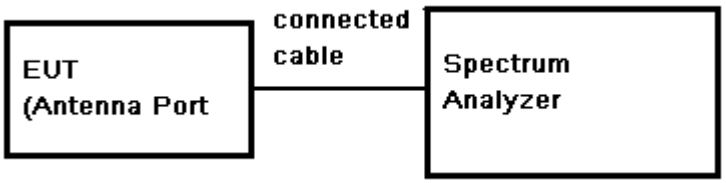


Item	Freq.	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Detector
(Mark)	(MHz)	(dBµV)	(dB)	(dB)	(dBµV)	(dBµV)	(dB)	
1	0.154	22.01	0.34	0.10	22.45	58.71	-36.26	Average
2	0.154	43.90	0.34	0.10	44.34	65.78	-21.44	QP
3	0.174	29.60	0.31	0.10	30.01	57.40	-27.39	Average
4	0.174	45.15	0.31	0.10	45.56	64.77	-19.21	QP
5	0.204	48.18	0.29	0.10	48.57	55.68	-7.11	Average
6	0.204	47.85	0.29	0.10	48.24	63.45	-15.21	QP
7	0.219	17.14	0.29	0.10	17.53	54.94	-37.41	Average
8	0.219	38.89	0.29	0.10	39.28	62.88	-23.60	QP
9	0.329	18.65	0.30	0.10	19.05	50.53	-31.48	Average
10	0.329	27.26	0.30	0.10	27.66	59.49	-31.83	QP
11	14.594	27.99	0.38	0.10	28.47	50.00	-21.53	Average
12	14.594	34.85	0.38	0.10	35.33	60.00	-24.67	QP

Level = Read Level + LISN/ISN Factor + Cable Loss.

7.4 6dB Occupied Bandwidth

Test Configuration:



Limit: ≥ 500 kHz

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=100KHz, VBW =3* RBW, Span=5MHz, Sweep=auto
4. Mark the peak frequency and –6dB (upper and lower) frequency.
5. Repeat above procedures until all frequency measured was complete.

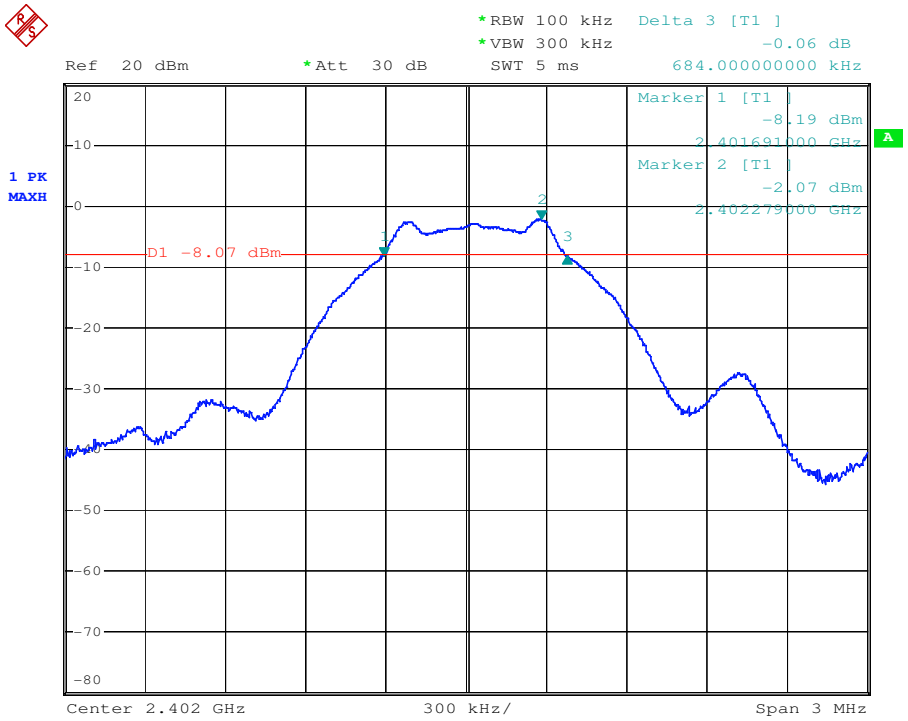
Test Result: Pass

Test date:

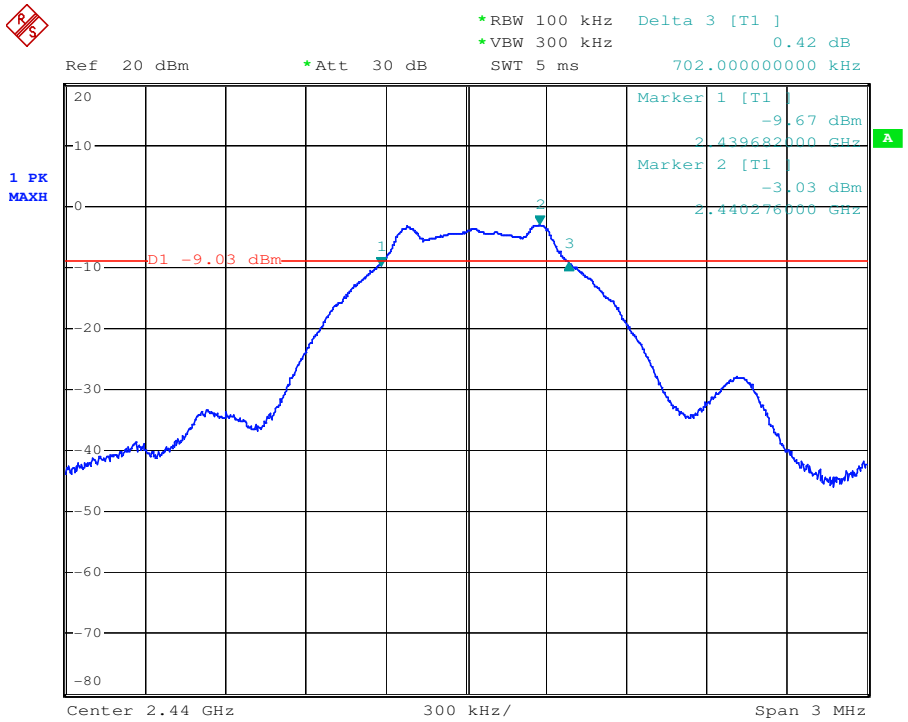
Test Channel	Channel Frequency (MHz)	Bandwidth (MHz)
Low	2402	0.684
Middle	2440	0.702
High	2480	0.702

Test plot as follows:

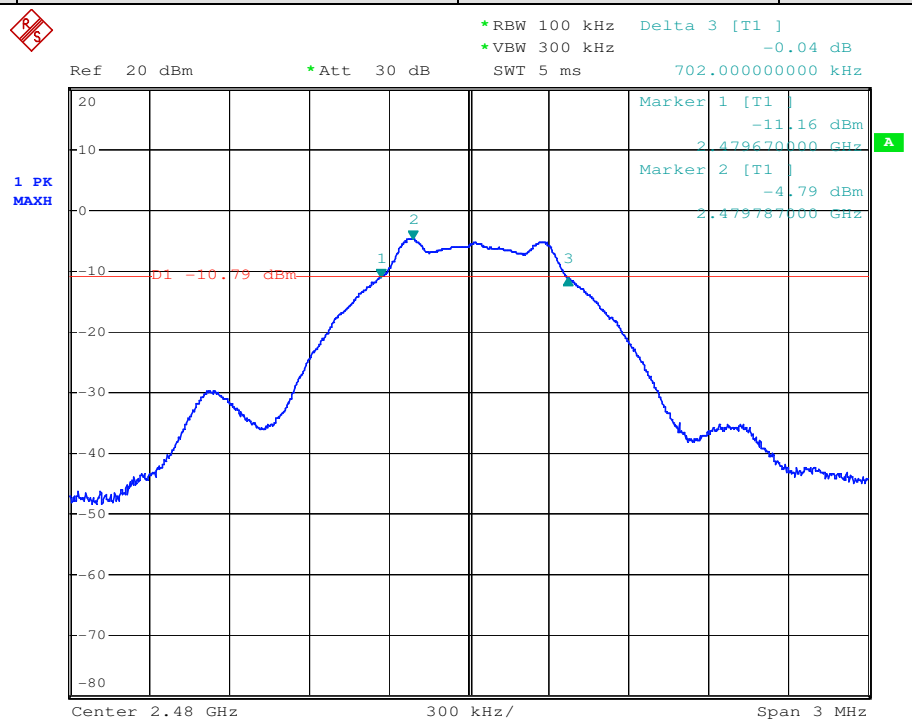
Test mode:	GFSK	Test channel:	Lowest



Test mode:	GFSK	Test channel:	Middle



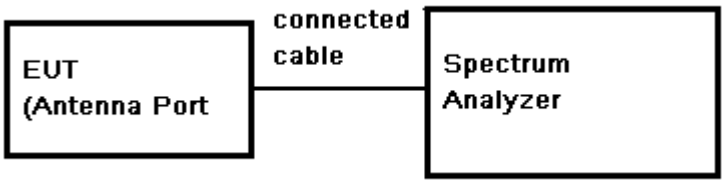
Test mode:	GFSK	Test channel:	Highest



7.5 Conducted Peak Output Power

Test Limit: 30dBm

Test Configuration:



Test Procedure:

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW = 3 MHz, VBW = 10 MHz, Span= fully encompass the bandwidth, Sweep = auto; Detector Function = Peak Trace mode=max hold
3. Use the spectrum analyzer's channel power measurement function with the band limits set equal to the bandwidth edges.
4. Keep the EUT in transmitting at lowest, middle and highest channel individually. Record the max value.

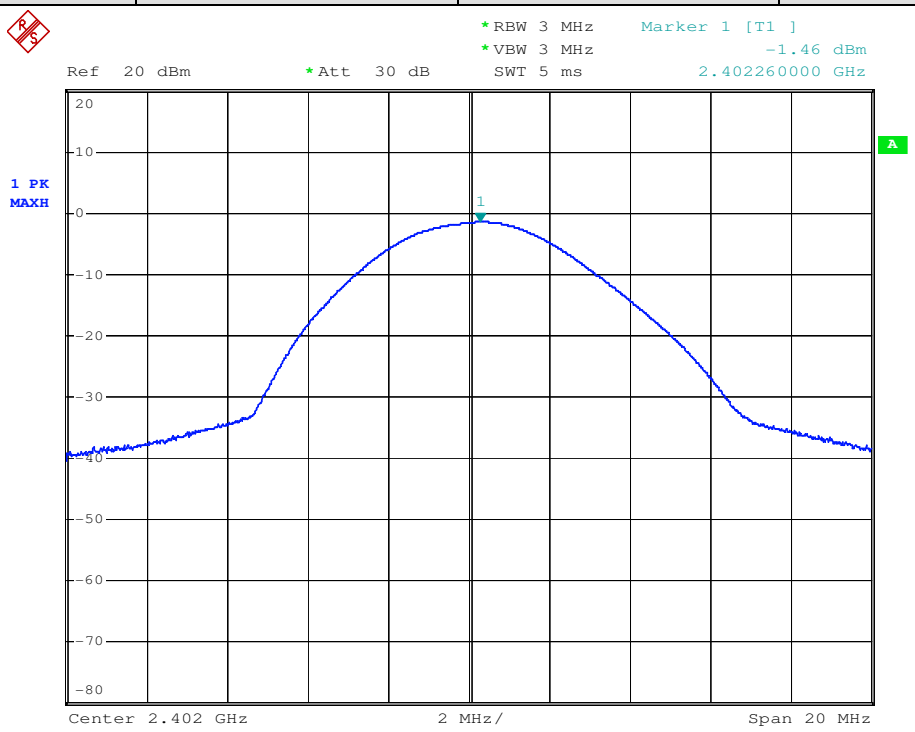
Test Result: Pass

Test data:

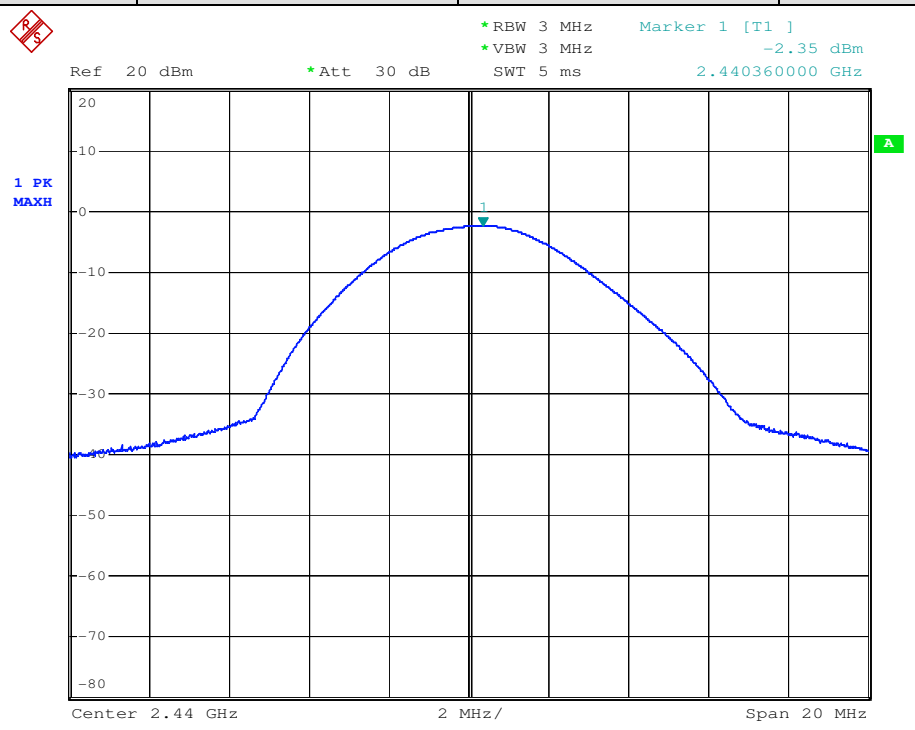
Test Channel	Fundamental Frequency (MHz)	Reading Power (dBm)	Cable Loss (dB)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Lowest	2402	-1.46	0.5	-0.96	30	31.15
Middle	2440	-2.35	0.5	-1.85	30	31.28
Highest	2480	-4.12	0.5	-3.62	30	31.83

Test result plot as follows:

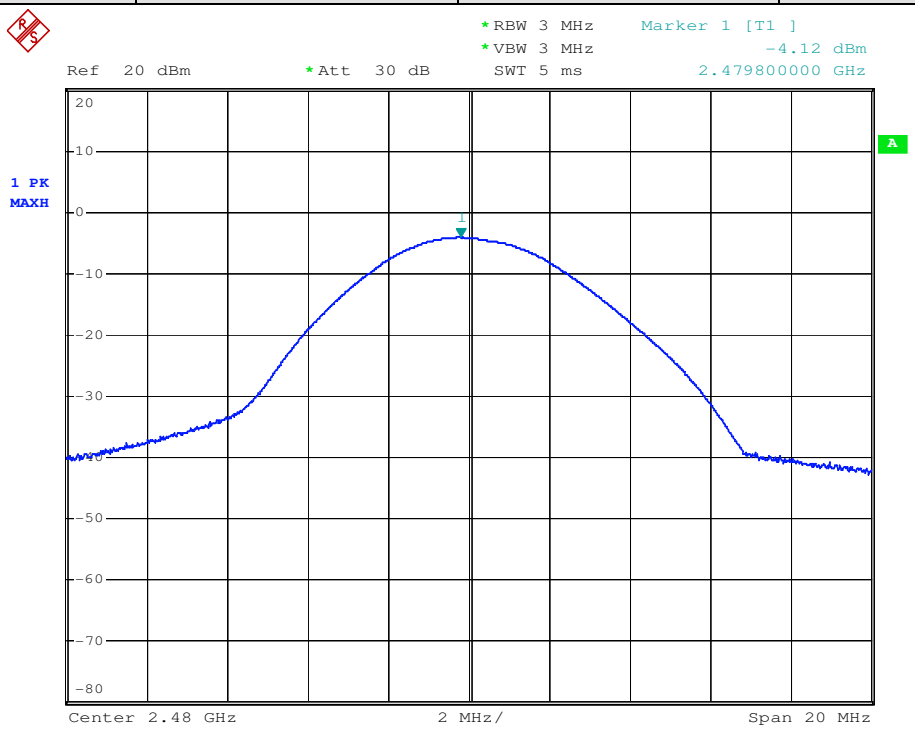
Test mode:	GFSK	Test channel:	Lowest



Test mode:	GFSK	Test channel:	Middle



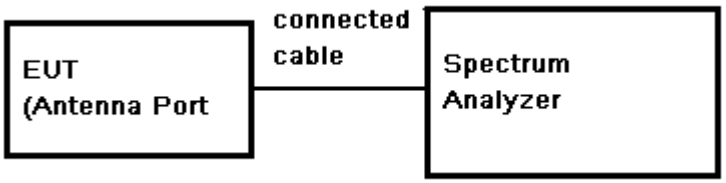
Test mode:	GFSK	Test channel:	Highest



7.6 Peak Power Spectral Density

Test Limit: 8dBm/3kHz

Test Configuration:



Test Procedure:

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: Center Frequency= Channel Frequency, RBW = 3 kHz VBW = 10 kHz. Span= fully encompass the bandwidth, Sweep = auto; Detector Function = Peak Trace mode=max hold,
3. Set MKR=Center Frequency, Trace=Clear Write.
4. Adjust the Span = 300 kHz, Sweep Time=100s, Trace=Max Hold, MKR=Peak Search.
5. Record the marker level for the particular mode.
6. Repeat these steps for other channel and device modes.

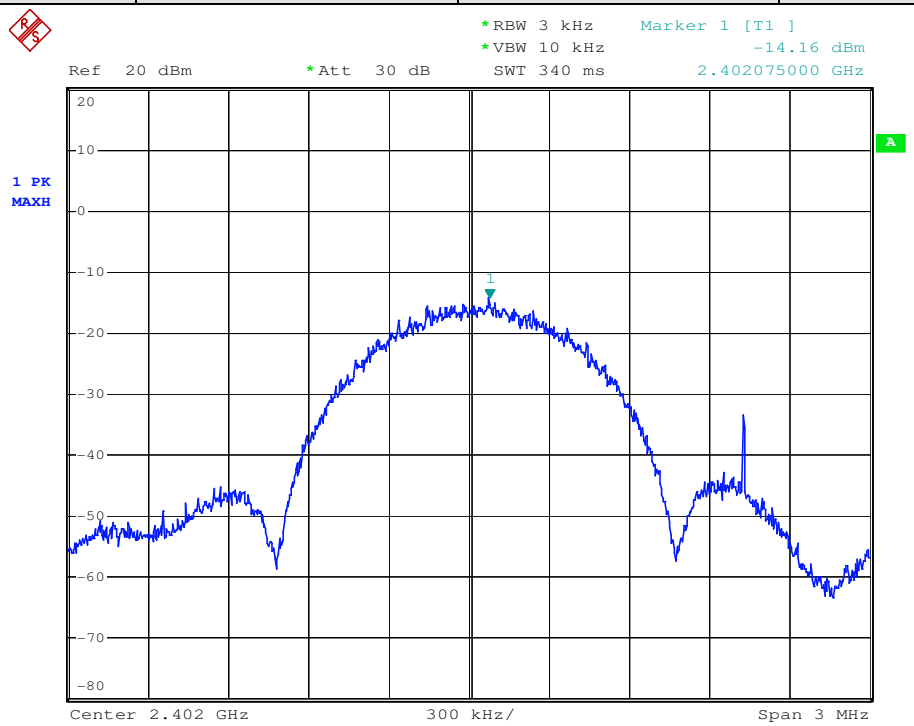
Test Result: Pass

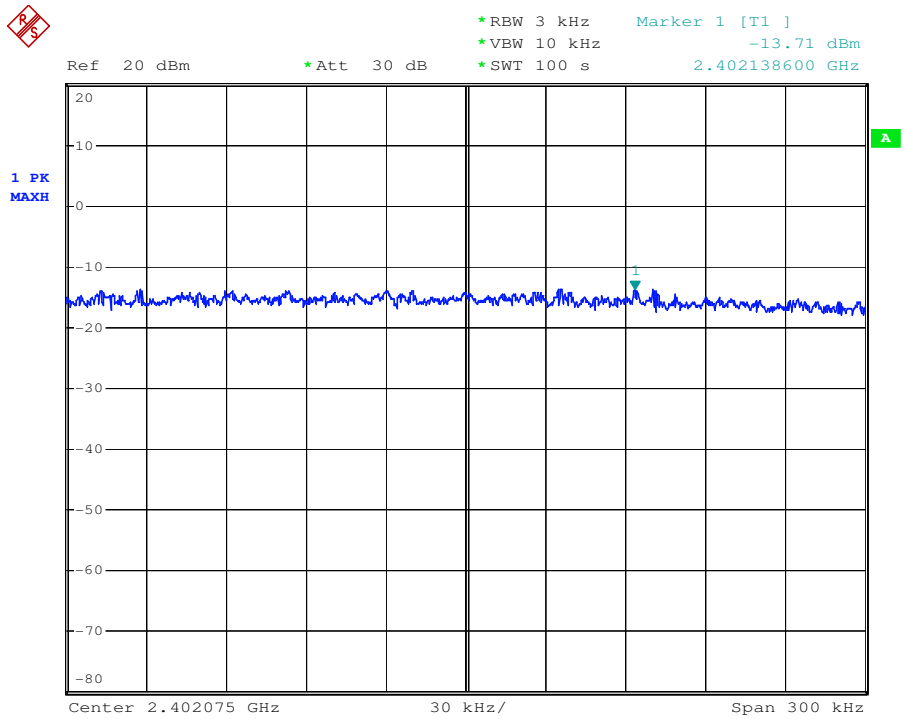
Test data:

Channel	Reading (dBm)	Cable Loss (dB)	RF Power Density (dBm)	Peak Power Limit (dBm)	Result
Low	-13.71	0.5	-13.21	8	PASS
Mid	-14.47	0.5	-13.97	8	PASS
High	-16.04	0.5	-15.54	8	PASS

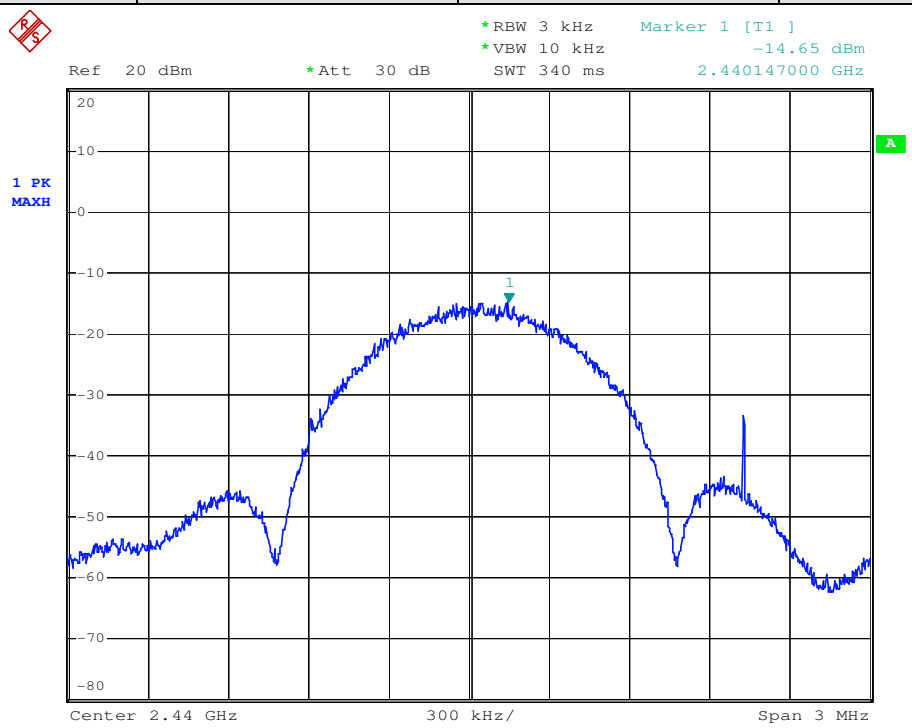
Test plot as follows:

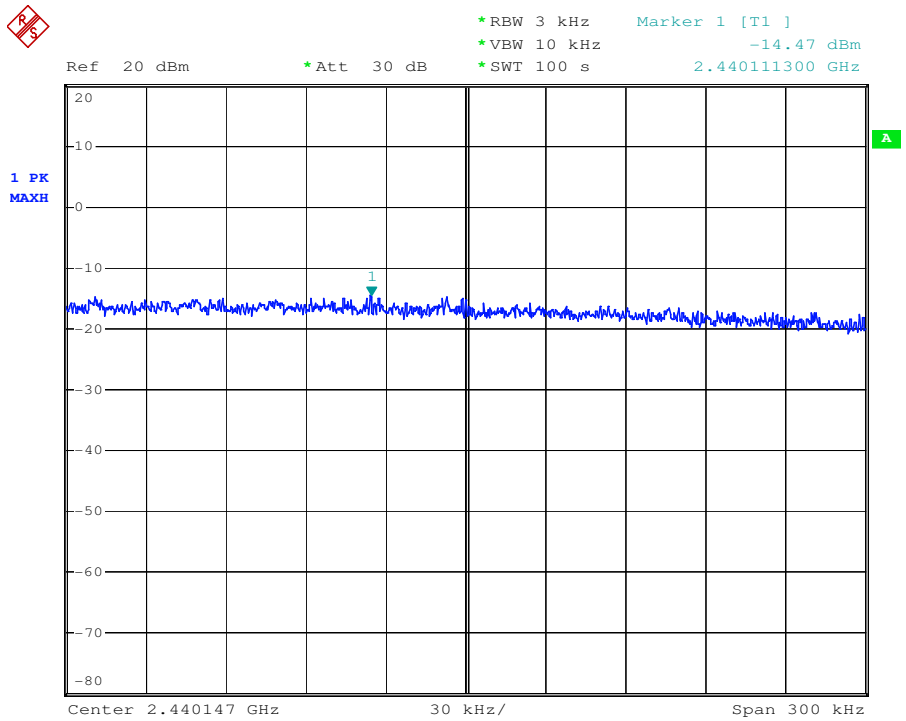
Test mode:	GFSK	Test channel:	Lowest



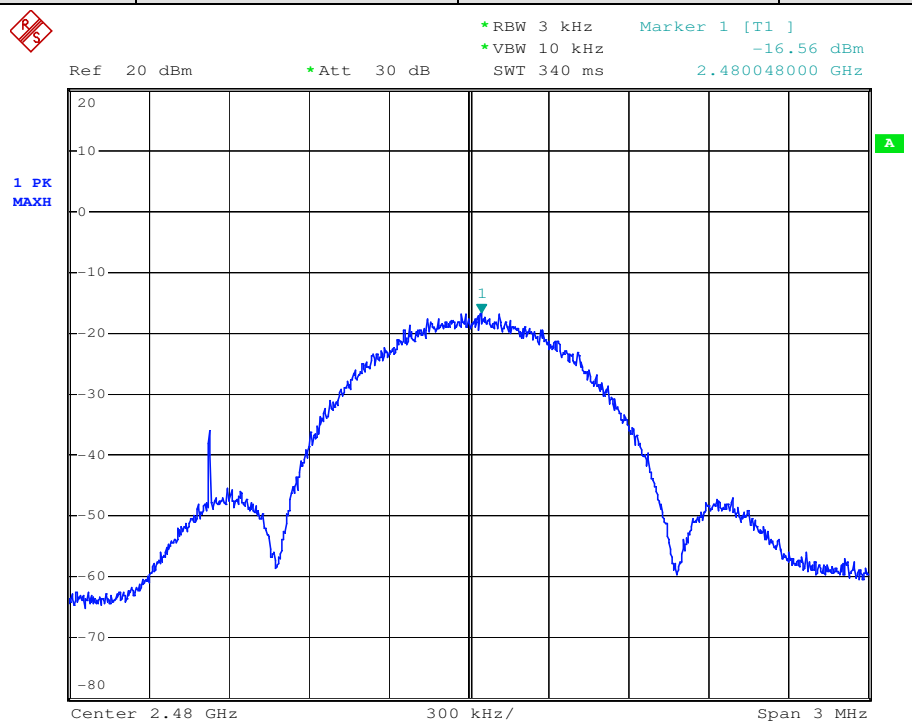


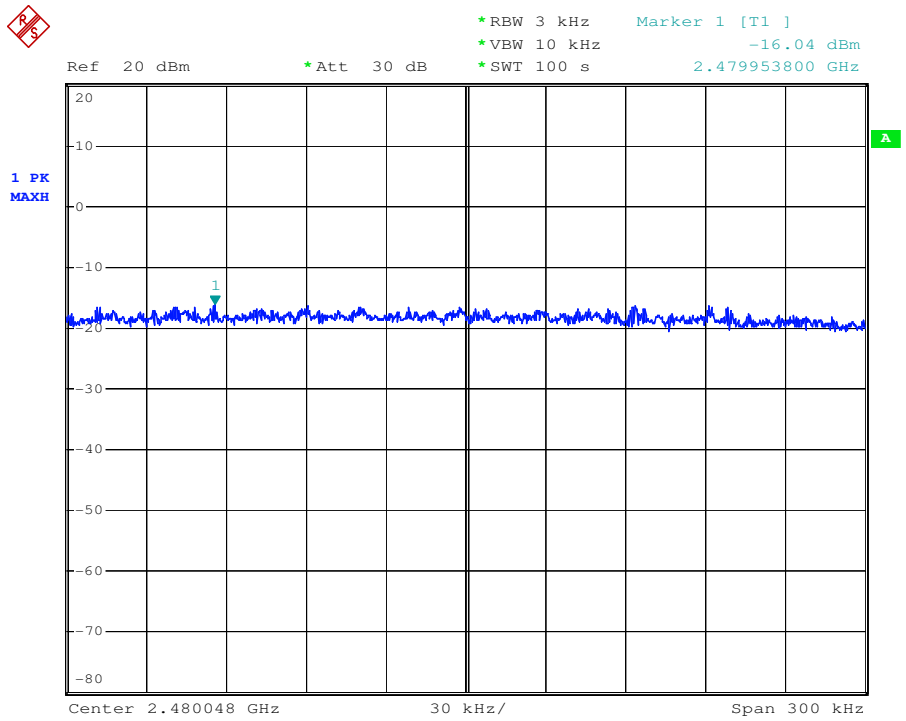
Test mode:	GFSK	Test channel:	Middle





Test mode:	GFSK	Test channel:	Highest

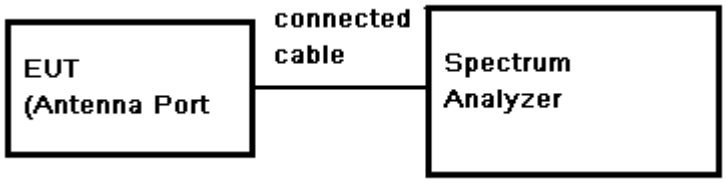




7.7 Conducted Spurious Emissions and Band edge

Limit: (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, provided the transmitter demonstrates compliance with the peak conducted power limits.

Test Configuration:



Test Procedure: 1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.

2. Set the spectrum analyzer: RBW = 100KHz. VBW >= RBW. Sweep = auto; Detector Function = Peak (Max. hold).

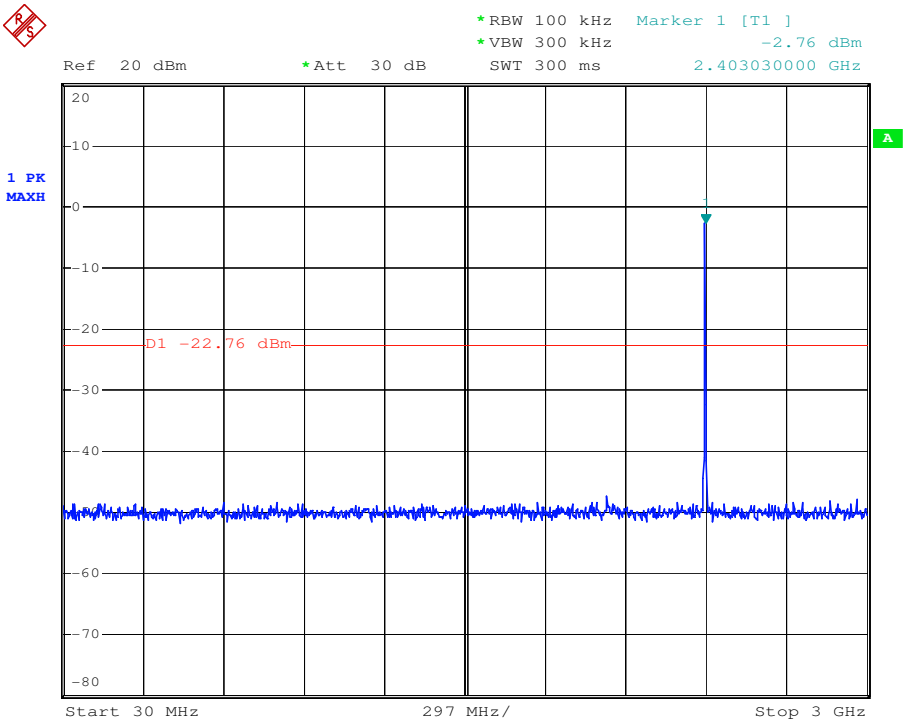
Test Result: Pass

7.7.1 Conducted Spurious Emissions

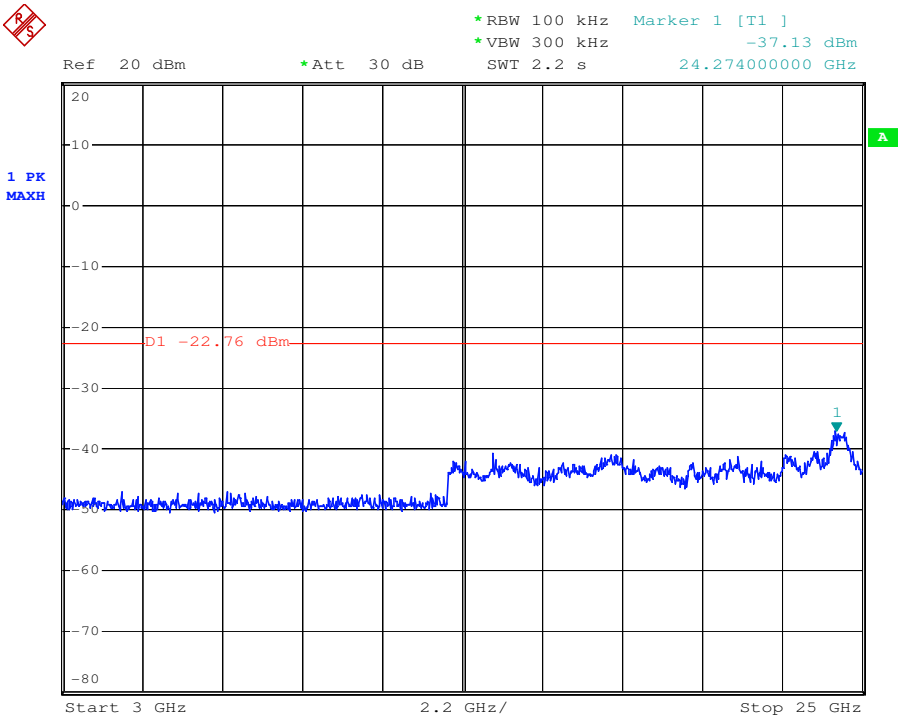
Test plot as follows:

Test mode:	GFSK	Test channel:	Lowest

30MHz-3GHz:

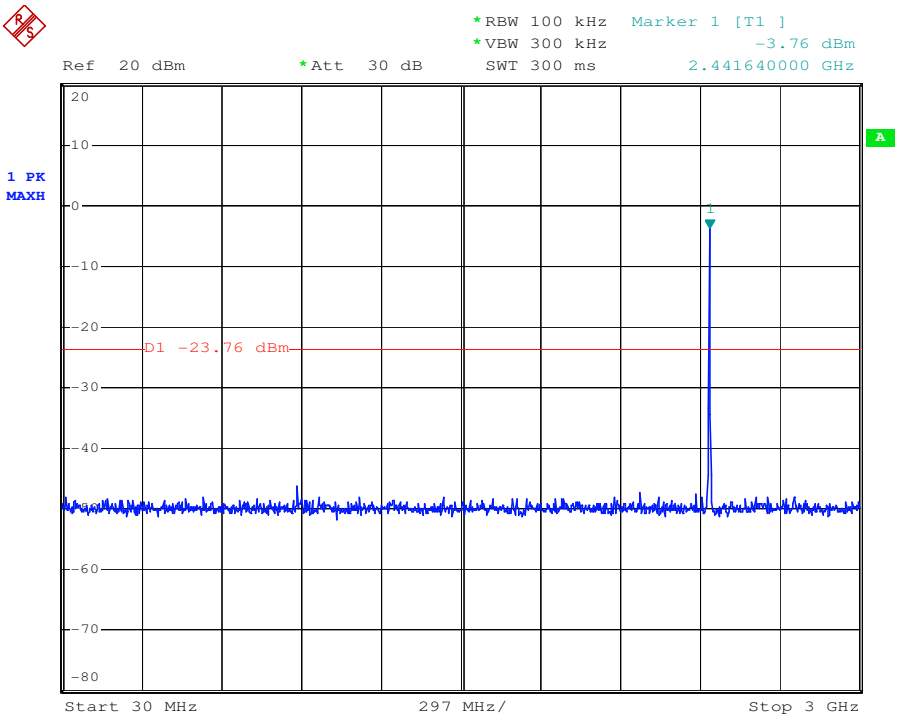


3GHz-25GHz:

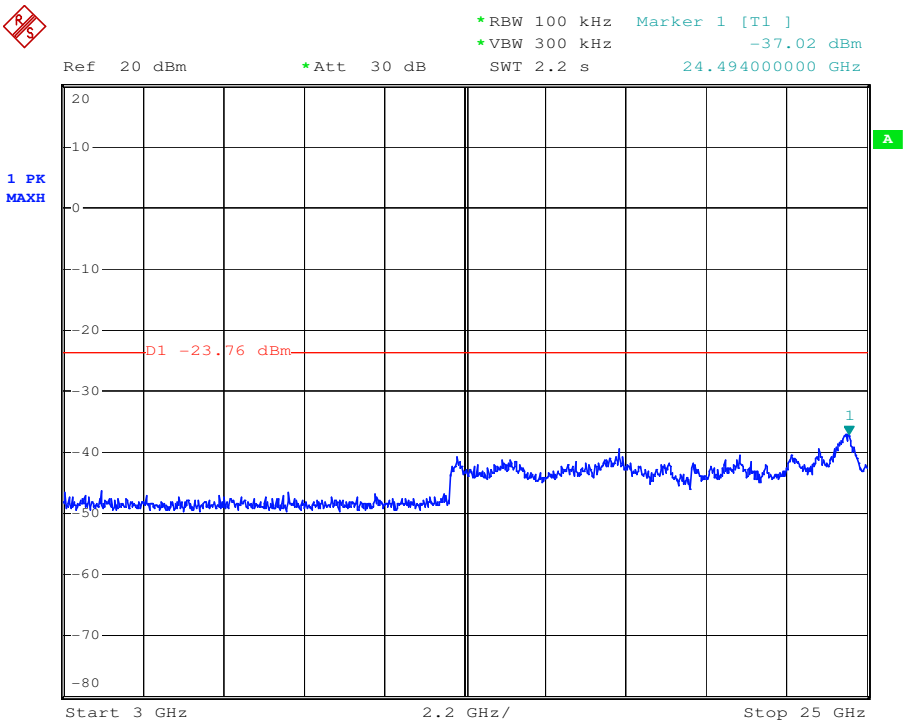


Test mode:	GFSK	Test channel:	Middle

30MHz-3GHz:

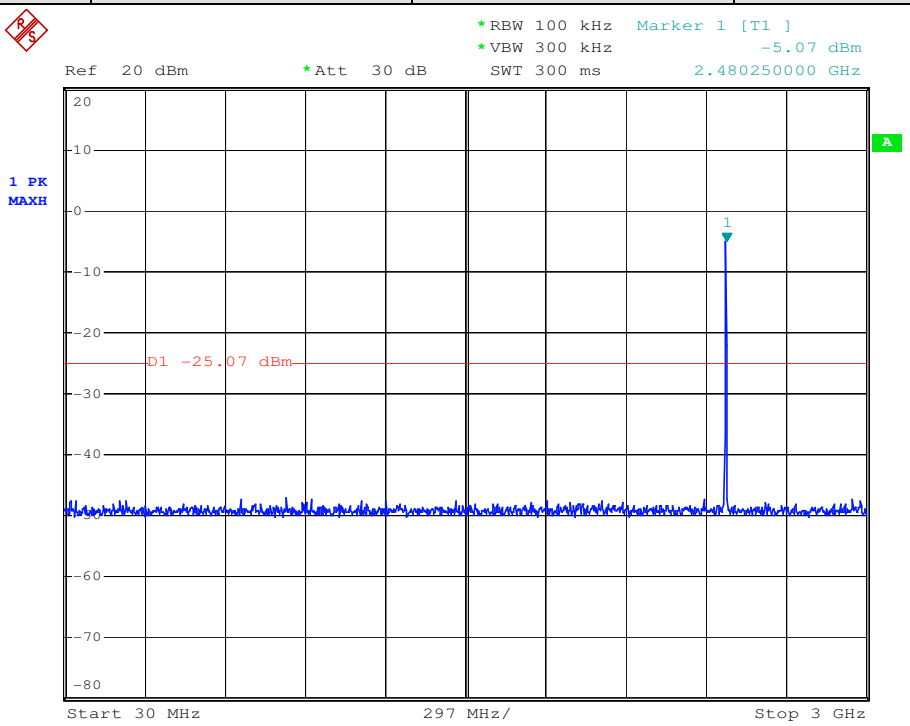


3GHz-25GHz:

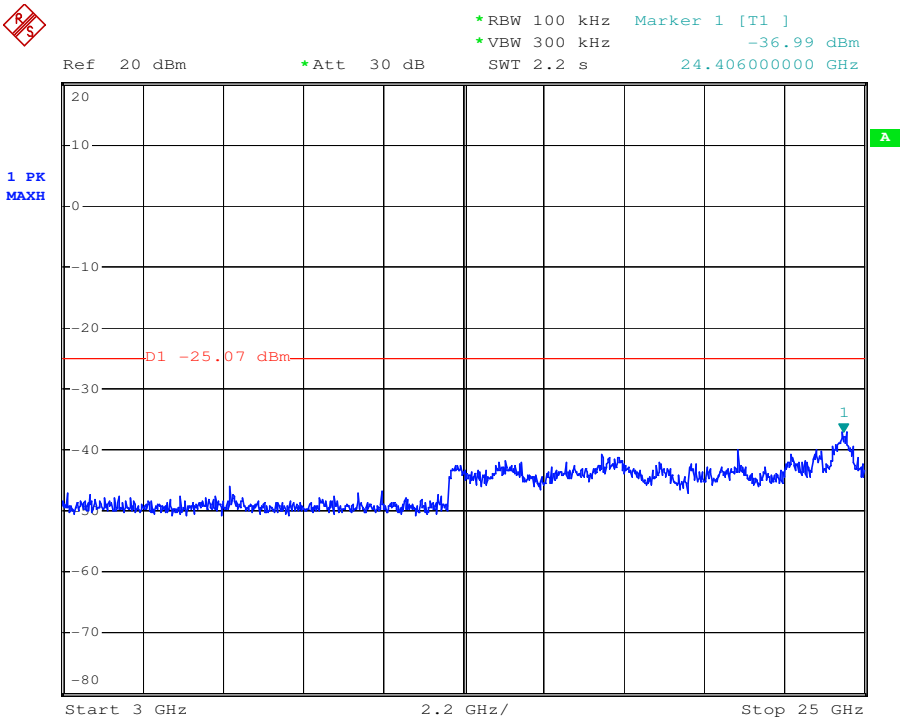


Test mode:	GFSK	Test channel:	Highest

30MHz-3GHz:



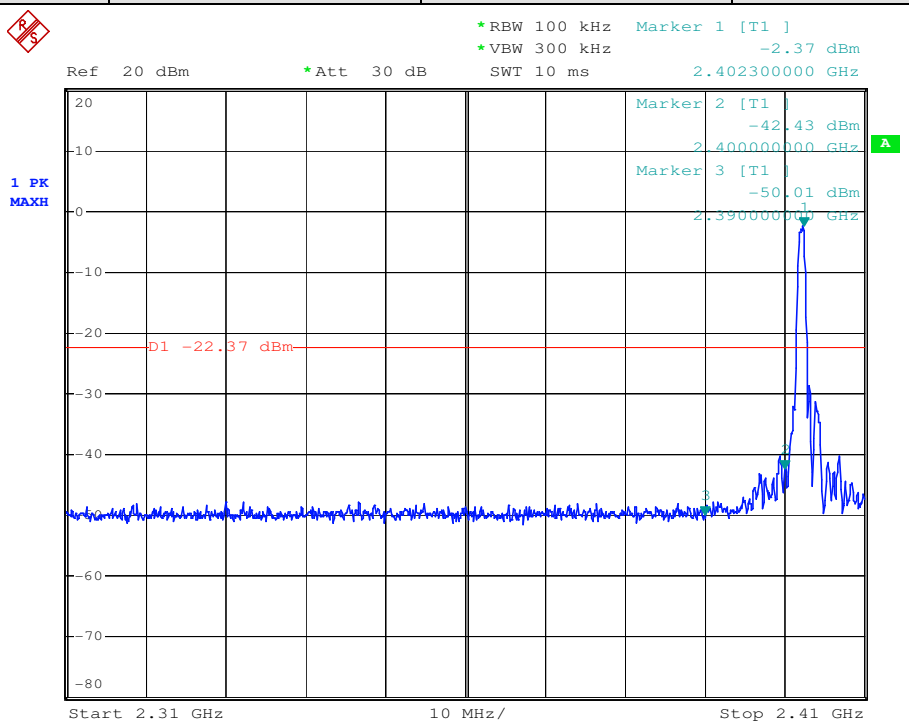
3GHz-25GHz:



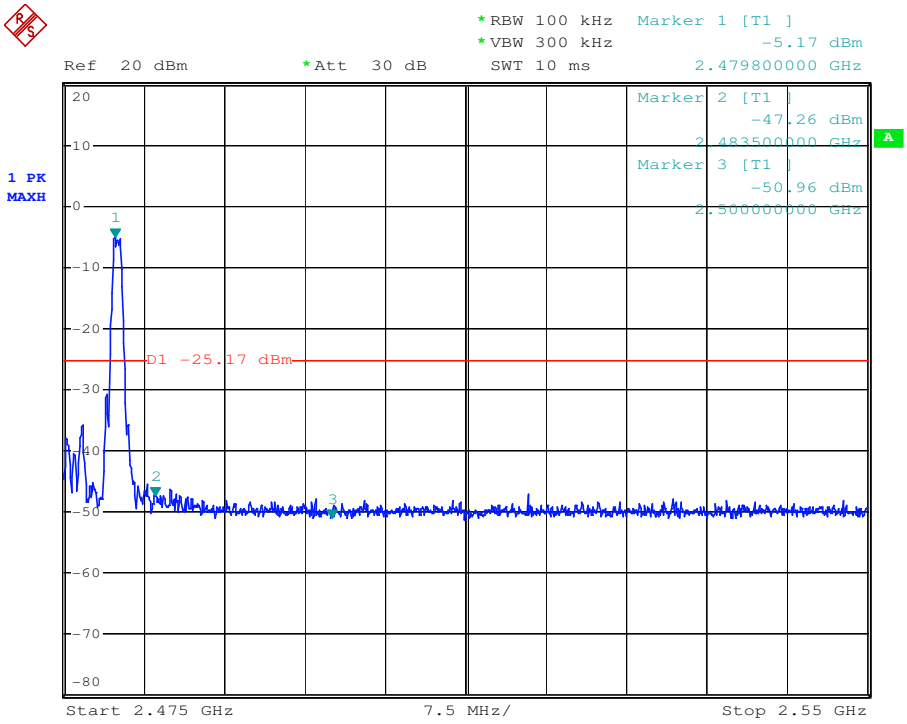
7.7.2 Conducted Band-edge

Test plot as follows:

Test mode:	GFSK	Test channel:	Lowest



Test mode:	GFSK	Test channel:	Highest



7.8 Radiated Spurious Emissions and Band-edge

Frequency Range: 9KHz to 25GHz

Test site/setup: Measurement Distance: 3m (Semi-Anechoic Chamber)

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

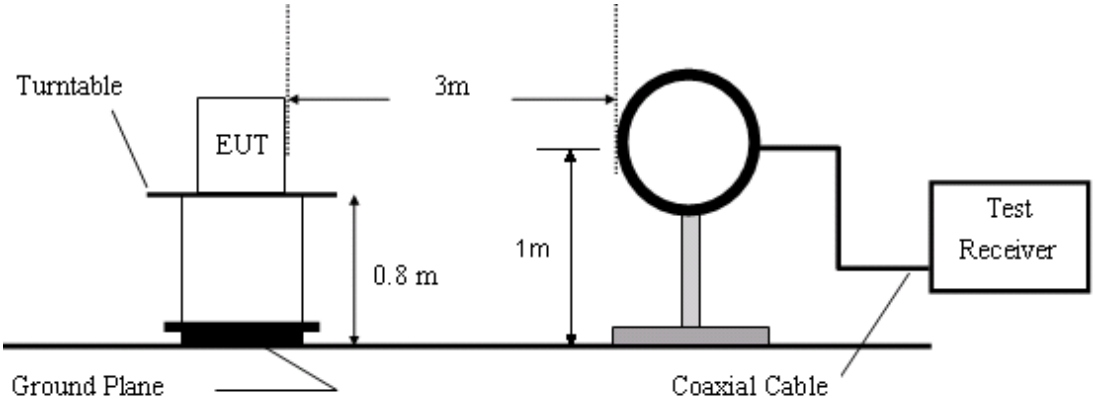


Figure1. Below 30MHz radiated emissions test configuration

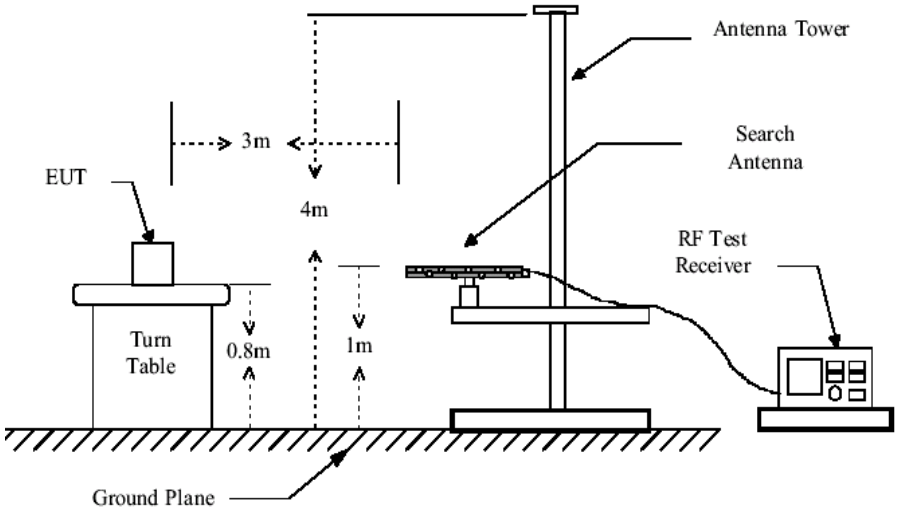


Figure 2. 30MHz to 1GHz radiated emissions test configuration

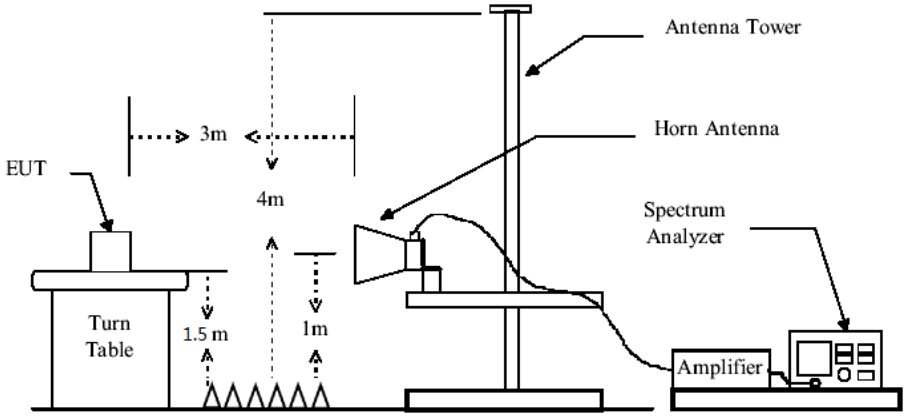


Figure 3. Above 1GHz radiated emissions test configuration

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.

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 5rd harmonic.
2) As shown in Section, for frequencies above 1000 MHz, 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.

The test only perform the EUT in transmitting status since the test frequencies were over 1GHz only required transmitting status.

Test Result: Pass

7.8.1 Radiated Spurious Emissions

30MHz-1GHz:

lowest Channel

Item	Freq.	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Result Level	Limit Line	Over Limit	Detector	Polarization
(Mark)	(MHz)	(dBµV)	(dB/m)	(dB)	(dB)	(dBµV/m)	(dBµV/m)	(dB)		
1	162.434	34.99	12.28	23.63	1.24	24.88	43.50	-18.62	QP	Horizontal
2	186.010	33.91	11.72	23.62	1.36	23.37	43.50	-20.13	QP	Horizontal
3	346.483	30.57	13.19	23.69	1.96	22.03	46.00	-23.97	QP	Horizontal
4	767.870	21.83	22.02	23.91	3.14	23.08	46.00	-22.92	QP	Horizontal
5	900.970	26.10	22.50	23.94	3.42	28.08	46.00	-17.92	QP	Horizontal
6	952.484	22.91	23.70	23.94	3.58	26.25	46.00	-19.75	QP	Horizontal
1	56.001	37.30	12.10	23.69	0.49	26.20	40.00	-13.80	QP	Vertical
2	111.347	45.68	10.60	23.65	0.98	33.61	43.50	-9.89	QP	Vertical
3	131.297	39.77	11.20	23.64	1.09	28.42	43.50	-15.08	QP	Vertical
4	163.182	38.21	12.27	23.63	1.24	28.09	43.50	-15.41	QP	Vertical
5	187.096	37.47	11.62	23.62	1.36	26.83	43.50	-16.67	QP	Vertical
6	916.069	27.59	22.90	23.94	3.47	30.02	46.00	-15.98	QP	Vertical

Middle Channel

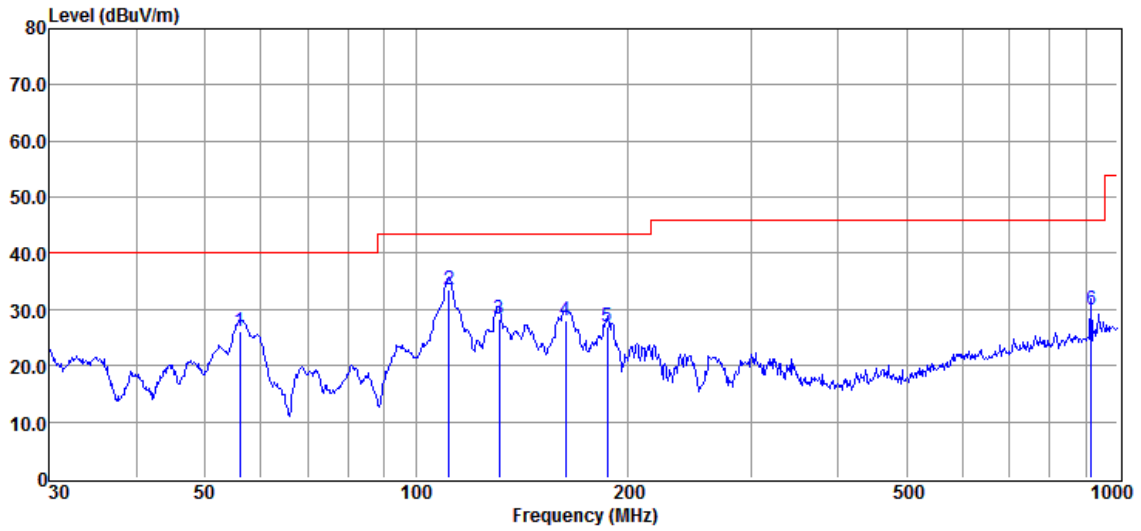
Item	Freq.	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Result Level	Limit Line	Over Limit	Detector	Polarization
(Mark)	(MHz)	(dBµV)	(dB/m)	(dB)	(dB)	(dBµV/m)	(dBµV/m)	(dB)		
1	113.563	39.41	10.77	23.65	1.00	27.53	43.50	-15.97	QP	Horizontal
2	145.122	43.82	12.00	23.64	1.16	33.34	43.50	-10.16	QP	Horizontal
3	151.352	41.27	12.30	23.64	1.17	31.10	43.50	-12.40	QP	Horizontal
4	184.802	40.58	11.78	23.62	1.36	30.10	43.50	-13.40	QP	Horizontal
5	214.845	44.82	9.05	23.63	1.44	31.68	43.50	-11.82	QP	Horizontal
6	233.688	45.11	9.62	23.64	1.51	32.60	46.00	-13.40	QP	Horizontal
1	37.922	45.08	12.90	23.71	0.24	34.51	40.00	-5.49	QP	Vertical
2	45.300	49.09	13.08	23.70	0.33	38.80	40.00	-1.20	QP	Vertical
3	131.181	49.26	11.17	23.64	1.09	37.88	43.50	-5.62	QP	Vertical
4	167.222	46.78	12.23	23.63	1.26	36.64	43.50	-6.86	QP	Vertical
5	189.772	47.55	11.45	23.62	1.37	36.75	43.50	-6.75	QP	Vertical
6	212.437	47.65	9.07	23.63	1.44	34.53	43.50	-8.97	QP	Vertical

Highest Channel

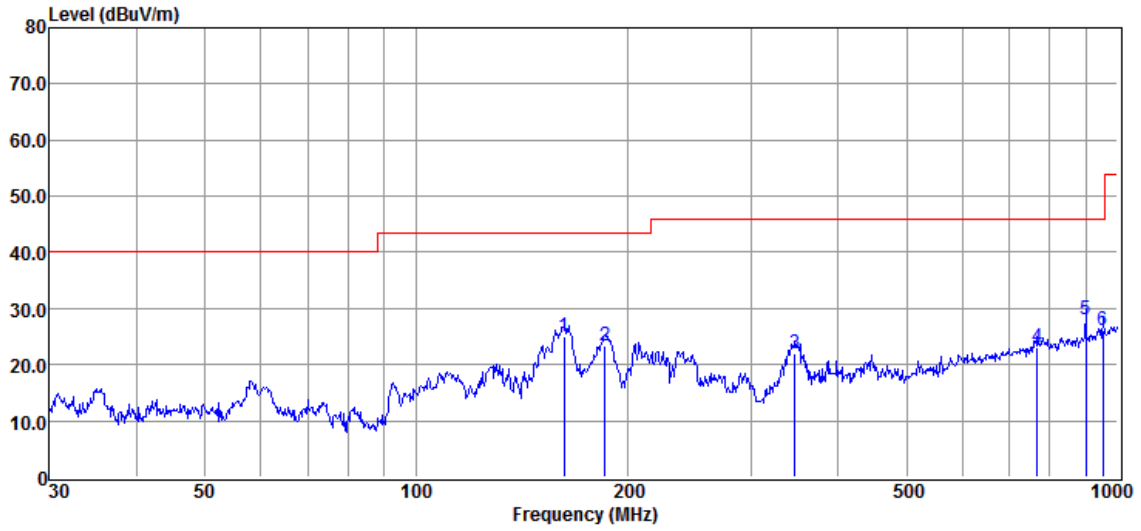
Item	Freq.	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Result Level	Limit Line	Over Limit	Detector	Polarization
(Mark)	(MHz)	(dBµV)	(dB/m)	(dB)	(dB)	(dBµV/m)	(dBµV/m)	(dB)		
1	83.816	46.98	8.56	23.67	0.74	32.61	40.00	-7.39	QP	Horizontal
2	122.404	46.22	11.17	23.65	1.04	34.78	43.50	-8.72	QP	Horizontal
3	264.746	48.09	10.79	23.65	1.66	36.89	46.00	-9.11	QP	Horizontal
4	494.198	45.87	16.20	23.73	2.42	40.76	46.00	-5.24	QP	Horizontal
5	543.274	45.67	17.25	23.77	2.56	41.71	46.00	-4.29	QP	Horizontal
6	711.673	41.59	20.55	23.88	2.99	41.25	46.00	-4.75	QP	Horizontal
1	32.864	42.92	12.56	23.71	0.15	31.92	40.00	-8.08	QP	Vertical
2	195.136	39.44	10.35	23.62	1.38	27.55	43.50	-15.95	QP	Vertical
3	361.714	42.36	13.65	23.69	2.01	34.33	46.00	-11.67	QP	Vertical
4	519.065	43.81	16.88	23.75	2.48	39.42	46.00	-6.58	QP	Vertical
5	663.473	44.33	19.88	23.85	2.87	43.23	46.00	-2.77	QP	Vertical
6	737.071	41.66	21.00	23.89	3.06	41.83	46.00	-4.17	QP	Vertical

Result Level = Read Level + Antenna Factor + Cable loss - Preamp Factor

Below is the plot of worst case on lowest channel:
Vertical:



Horizontal:



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	38.36	6.18	44.54	54	-9.46	peak	Horizontal
2	7206	38.34	10.63	48.97	54	-5.03	peak	Horizontal
3	9608	37.43	14.38	51.81	54	-2.19	peak	Horizontal
4	4804	38.26	6.18	44.44	54	-9.56	peak	Vertical
5	7206	37.98	10.63	48.61	54	-5.39	peak	Vertical
6	9608	36.62	14.38	51.00	54	-3.00	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	38.18	6.97	45.15	54	-8.85	peak	Horizontal
2	7320	37.13	11.12	48.25	54	-5.75	peak	Horizontal
3	9760	37.92	14.35	52.27	54	-1.73	peak	Horizontal
4	4880	36.95	6.97	43.92	54	-10.08	peak	Vertical
5	7320	38.53	11.12	49.65	54	-4.35	peak	Vertical
6	9760	36.52	14.35	50.87	54	-3.13	peak	Vertical

Test in **Channel High** in transmitting status

Mark	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Emission (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	polarization
1	4960	40.74	7.49	48.23	54	-5.77	peak	Horizontal
2	7440	38.94	11.65	50.59	54	-3.41	peak	Horizontal
3	9920	37.95	14.40	52.35	54	-1.65	peak	Horizontal
4	4960	40.48	7.49	47.97	54	-6.08	peak	Vertical
5	7440	37.04	11.65	48.69	54	-5.31	peak	Vertical
6	9920	36.43	14.40	50.83	54	-3.17	peak	Vertical

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

2. No any other emissions level which are attenuated less than 20dB below the limit.
According to 15.31(o), the amplitude of spurious emissions from intentional radiators and emissions from unintentional radiators which are attenuated more than 20 dB below the permissible value need not be reported unless specifically required elsewhere in this Part. Hence there no other emissions have been reported.

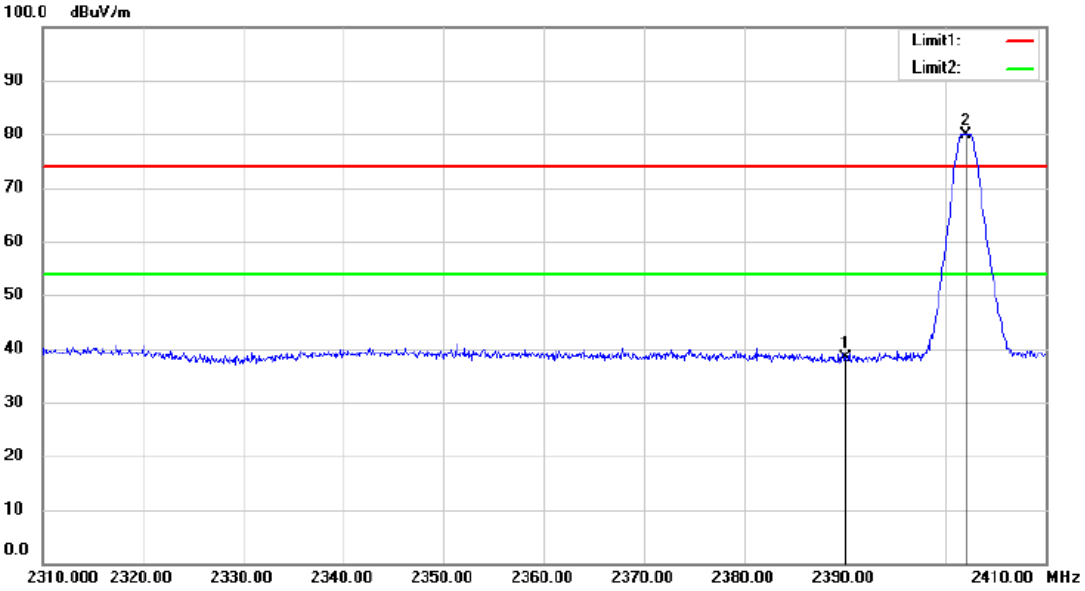
3. If the Peak value below the AV Limit, the AV test doesn't perform for this submission.

7.8.2 Radiated Band-edge

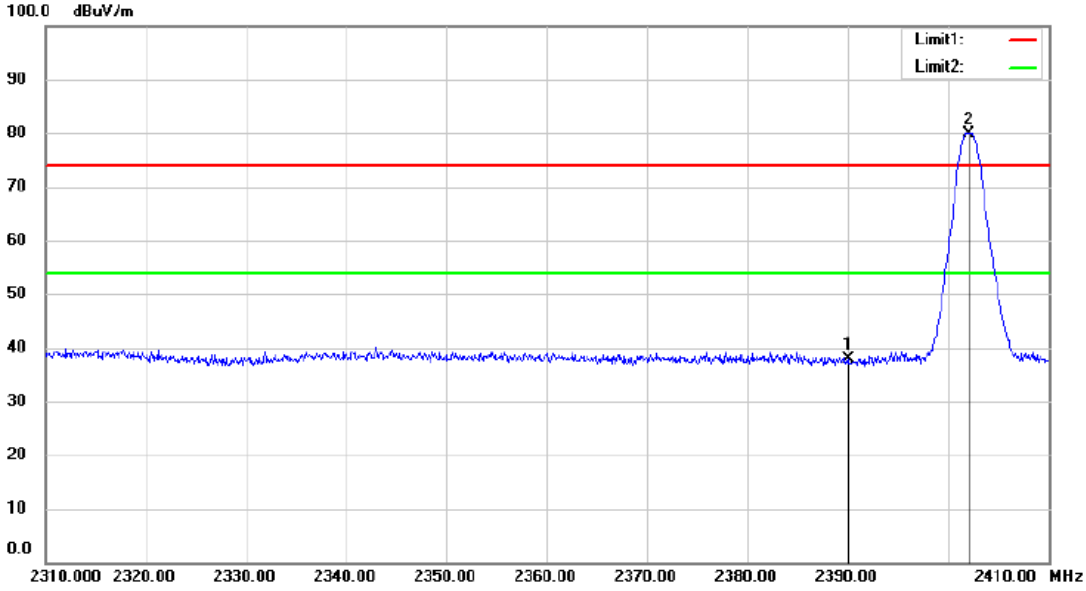
Lowest Channel(2402MHz) **Modulation: GFSK**

MK.	Frequency (MHz)	Reading (dBuV/m)	Corrected factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Polarization
1	2390	42.17	-3.89	38.28	54	-15.72	Peak	Horizontal
2	2402	83.81	-3.91	79.90	54	25.90	Peak	Horizontal
1	2390	41.86	-3.89	37.97	54	-16.03	Peak	Vertical
2	2402	83.81	-3.91	79.90	54	25.90	Peak	Vertical

Horizontal:



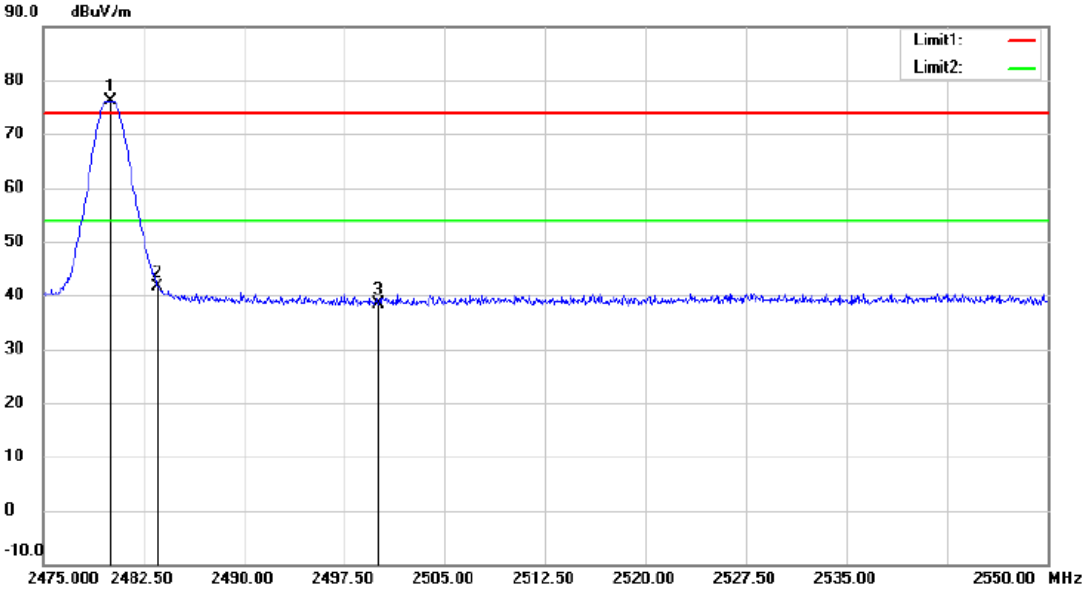
Vertical:



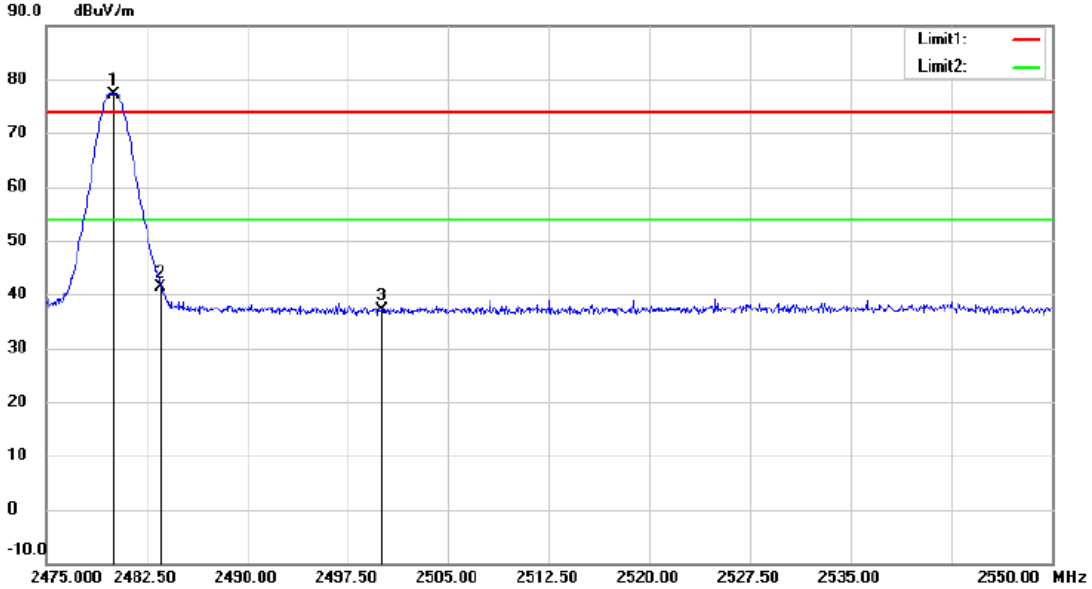
CH High 2480MHz **Modulation: GFSK**

MK.	Frequency (MHz)	Reading (dBuV/m)	Corrected factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Polarization
1	2480	80.08	-4.00	76.08	54	22.08	Peak	Horizontal
2	2483.5	45.52	-4.01	41.51	54	-12.49	Peak	Horizontal
3	2500	42.35	-4.03	38.32	54	-15.68	Peak	Horizontal
1	2480	81.20	-4.00	77.20	54	23.20	Peak	Vertical
2	2483.5	45.41	-4.01	41.40	54	-12.60	Peak	Vertical
3	2500	41.20	-4.03	37.17	54	-16.83	Peak	Vertical

Horizontal:



Vertical:



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

2. No any other emissions level which are attenuated less than 20dB below the limit. According to 15.31(o), the amplitude of spurious emissions from intentional radiators and emissions from unintentional radiators which are attenuated more than 20 dB below the permissible value need not be reported unless specifically required elsewhere in this Part. Hence there no other emissions have been reported.

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

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	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	
13.36 - 13.41			

8 Test Setup Photographs

Refer to the < Model E _Test Setup photos-FCC>.

9 EUT Constructional Details

Refer to the < Model E _External Photos-FCC> & < Model E _Internal Photos-FCC>.

--End of the Report--