TEST REPORT

of

FCC Part 15 Subpart C and CANADA RSS-210

☒ New Application; ☐ Class I PC; ☐ Class II PC

Product :	**Outdoor Navigation Device**
Brand:	**Magellan, Mio, Navman, Mitac**
Model:	**N429**
Model Difference:	**N/A**
FCC ID:	**P4Q-N429**
IC:	**2420C-N429**
FCC Rule Part:	**§15.249**
IC Rule Part:	**RSS-210 issue 8:2010, Annex 2.9**
Applicant:	**Mitac International Corporation**
Address:	**Building B, No. 209, Sec. 1, Nan Gang Rd., Nan Gan, Taipei, Taiwan**

Test Performed by:

International Standards Laboratory
<Lung-Tan LAB>
*Site Registration No.
BSMI: SL2-IN-E-0013; MRA TW1036; TAF: 0997; IC: IC4067B-3;
*Address:
No. 120, Lane 180, San Ho Tsuen, Hsin Ho Rd.
Lung-Tan Hsiang, Tao Yuan County 325, Taiwan
*Tel : 886-3-407-1718; Fax: 886-3-407-1738

Report No.: **ISL-14LR081FCDXX**

Issue Date : **2014/04/17**

Test results given in this report apply only to the specific sample(s) tested and are traceable to national or international standard through calibration of the equipment and evaluating measurement uncertainty herein.

This report MUST not be used to claim product endorsement by TAF, NVLAP or any agency of the Government.

VERIFICATION OF COMPLIANCE

Applicant:	Mitac International Corporation
Product Description:	Outdoor Navigation Device
Brand Name:	Magellan, Mio, Navman, Mitac
Model No.:	N429
Model Difference:	N/A
FCC ID:	P4Q-N429
IC:	2420C-N429
FCC Rule Part:	§15.249
IC Rule Part:	RSS-210 issue 8:2010, Annex 2.9
Date of test:	2014/04/01 ~ 2014/04/16
Date of EUT Received:	2014/04/01

We hereby certify that:

All the tests in this report have been performed and recorded in accordance with the standards described above and performed by an independent electromagnetic compatibility consultant, International Standards Laboratory.

The test results contained in this report accurately represent the measurements of the characteristics and the energy generated by sample equipment under test at the time of the test. The sample equipment tested as described in this report is in compliance with the limits of above standards.

Test By:	Dion Chen	***Date:***	2014/04/17
	Dion Chang / Engineer		
Prepared By:	Gigi yeh	***Date:***	2014/04/17
	Gigi Yeh / Specialist		
Approved By:	Vincent Su	***Date:***	2014/04/17
	Vincent Su / Technical Manager		

Version

Version No.	Date	Description
00	2014/04/17	Initial creation of document

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1. General Information

1.1. Product Description

General:

Product Name	Outdoor Navigation Device	
Brand Name	Magellan, Mio, Navman, Mitac	
Model Name	N429	
Model Difference	N/A	
USB port	One provided for Data link	
Power Supply	5Vdc from AC/DC adapter or 3.7Vdc, 1500mAh Li-ion Battery	
	Adapter:	Model: MII050100; Supplier: TPT
GPS Receiver	1575MHz Receiver	
VOIP	N/A	

Bluetooth:

Bluetooth Version	V2.1 + EDR (GFSK + π /4 DQPSK + 8DPSK)	V4.0(GFSK)
Frequency Range	2402 – 2480MHz	2402 – 2480MHz
Channel number	79 channels	40 channels
Modulation type	Frequency Hopping Spread Spectrum	Wide band Modulation
Rated power	4 dBm(Peak)	8 dBm(Peak)
Max Measured Transmit Power	3.72 (Peak)	7.05 dBm (Peak)
Dwell Time	<= 0.4s	N/A
Antenna Designation	PIFA Antenna 1.6dBi , share the same antenna with Wifi	

The EUT is compliance with Bluetooth EDR V2.1 +V4.0 Standard.

WLAN: 1Tx / 1Rx

Frequency Range:	802.11b/g/n HT20: 2412 – 2462MHz			
Channel number:	802.11b/g/n HT20: 11 channels			
Transmit Power:		Measured Peak Power at each Chain	Rated AV Power at each Chain	Tolerance
	802.11b:	16.29dBm	15.0 dBm	+/- 1dB
	802.11g:	22.78dBm	13.0 dBm	+/- 1dB
	802.11n HT20 :	22.78dBm	13.0 dBm	+/- 1dB
Modulation Technology	11b/g: DSSS, OFDM 11n: OFDM			
Modulation type:	CCK, DQPSK, DBPSK for DSSS 64QAM. 16QAM, QPSK, BPSK for OFDM			
Transition Rate:	802.11 b: 1/2/5.5/11 Mbps 802.11 g: 6/9/12/18/24/36/48/54 Mbps 802.11 n HT20MHz: 6.5 – 65Mbps			
Antenna Designation:	PIFA Antenna, 1.6dBi			

The EUT is compliance with IEEE 802.11 b/g/n Standard.

ANT: 1Tx / 1Rx

Frequency Range:	2403 – 2481MHz
Modulation type:	GFSK
Transition Rate:	1M bps
Antenna Designation:	Fixed PIFA Antenna, 1.0dBi

The report applies for ANT mode.

Remark: The above DUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.2. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for **FCC ID**: **P4Q-N429** filing to comply with Section 15.249 of the FCC Part 15, Subpart C Rules and **IC: 2420C-N429** filing to comply with Industry Canada RSS-210 issue 8:2010 Annex 2.9.

1.3. Test Methodology

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4 (2009) and RSS-Gen: 2010. Radiated testing was performed at an antenna to EUT distance 3 meters.

1.4. Test Facility

The measurement facilities used to collect the 3m Radiated Emission and AC power line conducted data are located on the address of **International Standards Laboratory** <Lung-Tan LAB> No. 120, Lane 180, San Ho Tsuen, Hsin Ho Rd., Lung-Tan Hsiang, Tao Yuan County 325, Taiwan which are constructed and calibrated to meet the FCC requirements in documents ANSI C63.4: 2009. FCC Registration Number is: TW1036, Canada Registration Number: 4067B-3.

1.5. Special Accessories

Not available for this EUT intended for grant.

1.6. Equipment Modifications

Not available for this EUT intended for grant.

2. System Test Configuration

2.1. EUT Configuration

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

2.2. EUT Exercise

The Transmitter was operated in the engineering operating mode. the Tx frequency was fixed at 2403, 2443 and 2481MHz which were for the purpose of the measurements.

2.3. Test Procedure

2.3.1 Conducted Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plane. According to the requirements in Section 7 and 13 of ANSI C63.4-2009 and RSS-Gen: 2010. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-Peak and Average detector mode.

2.3.2 Radiated Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plane. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter(EUT) was rotated through three orthogonal axes according to the requirements in Section 8 and 13 of ANSI C63.4-2009 and RSS-Gen:2010.

2.4. Limitation

(1) Conducted Emission

According to section 15.207(a) and RSS-Gen §7.2.2 Conducted Emission Limits is as following.

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-Peak	Average
0.15 – 0.5	66 - 56	56 - 46
0.5 – 5	56	46
5 - 30	60	50

(2) Radiated Emission 15.249(a) and RSS-210 issue 8,§A2.9(a)

The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following.

Frequency (MHz)	Field strength of Fundamental	Field strength of Harmonics	Distance (m)
902 - 928	50 mV/m (94dBuV/m)	500 uV/m (54dBuV/m)	3
2400 – 2483.5	50 mV/m (94dBuV/m)	500 uV/m (54dBuV/m)	3
5725 – 5875	50 mV/m (94dBuV/m)	500 uV/m (54dBuV/m)	3

(3) Radiated Emission15.249 (d) and RSS-210 issue 8,§A2.9(b)

Emission Radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50dB below the level of the fundamental or to the general radiated emission limits in Section 15.209 and RSS-210 issue 8,§A2.9(a) as below, whichever is the lesser attenuation.

Frequency (MHz)	Field strength μV/m	Distance (m)	Field strength at 3m dBμV/m
1.705-30	30	30	69.54
30-88	100	3	40
88-216	150	3	43.5
216-960	200	3	46
Above 960	500	3	54

(4) Radiated Emission 15.249(e) and RSS-210 issue 8

For frequencies above 1000MHz, the above field strength limits are based on average limits. The peak filed strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20dB under any condition of modulation.

Remark:
1. Emission level in dBuV/m=20 log (uV/m)
2. Measurement was performed at an antenna to the closed point of EUT distance of meters.
3. Only spurious frequency is permitted to locate within the Restricted Bands specified in provision of ξ 15.205
4. Emission spurious frequency which appearing within the Restricted Bands specified in provision of ξ15.205, then the general radiated emission limits in ξ 15.209 apply.

2.5. Configuration of Tested System

Fig. 2-1 Configuration of Tested System

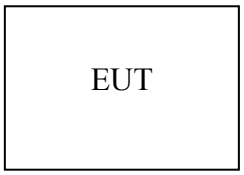


Table 2-2 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/ Type No.	Series No.	Data Cable	**Power Cord**
1	N/A					

Note: All the above equipment/cables were placed in worse case positions to maximize emission signals during emission test.

Grounding: Grounding was in accordance with the manufacturer's requirements and conditions for the intended use.

3. Summary of Test Results

FCC Rules	Description Of Test	Result
§15.207/ RSS-Gen §7.2.2	Conducted Emission	Compliant
§15.249(a)(d)(e) RSS-210 issue 8,§A2.9(a)(b)	Field Strength Measurement (TX and RX)	Compliant
§15.215(c)	20dB band width Measurement	Compliant
RSS-Gen §4.6.1	99% Power Bandwidth	Compliant

Description of test modes

The EUT has been tested under operating condition.

Test program used to control the EUT for staying in continuous transmitting and receive mode is programmed.

Channel low (2403MHz)、mid (2443MHz) and high (2481MHz) with highest data rate are chosen for full testing.

4. Conducted Emissions Test

4.1 Measurement Procedure:

1. The EUT was placed on a table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.

4.2 Test SET-UP (Block Diagram of Configuration)

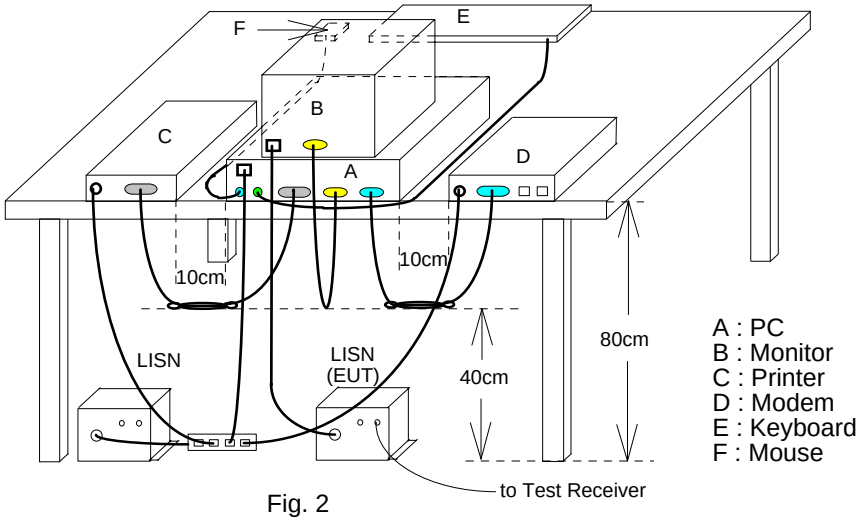


Fig. 2

4.3 Measurement Equipment Used:

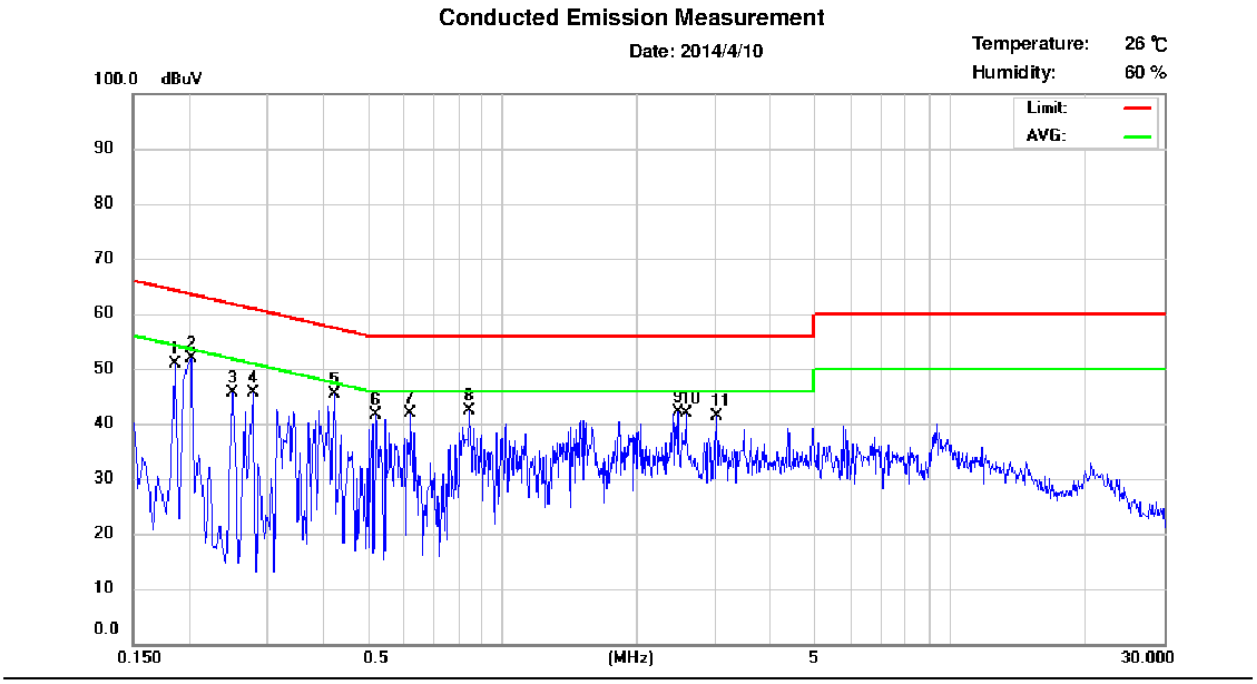
Conducted Emission Test Site					
EQUIPMENT TYPE	**MFR**	**MODEL NUMBER**	**SERIAL NUMBER**	**LAST CAL.**	**CAL DUE.**
Conduction 04-1 Cable	WOKEN	CFD 300-NL	Conduction 04 -1	09/24/2013	09/23/2014
EMI Receiver 16	Rohde & Schwarz	ESCI	101221	06/13/2013	06/12/2014
LISN 18	ROHDE & SCHWARZ	ENV216	101424	03/13/2014	03/12/2015
LISN 19	ROHDE & SCHWARZ	ENV216	101425	03/13/2014	03/12/2015

4.4 Measurement Result:

Note: Refer to next page for measurement data and plots.

AC POWER LINE CONDUCTED EMISSION TEST DATA

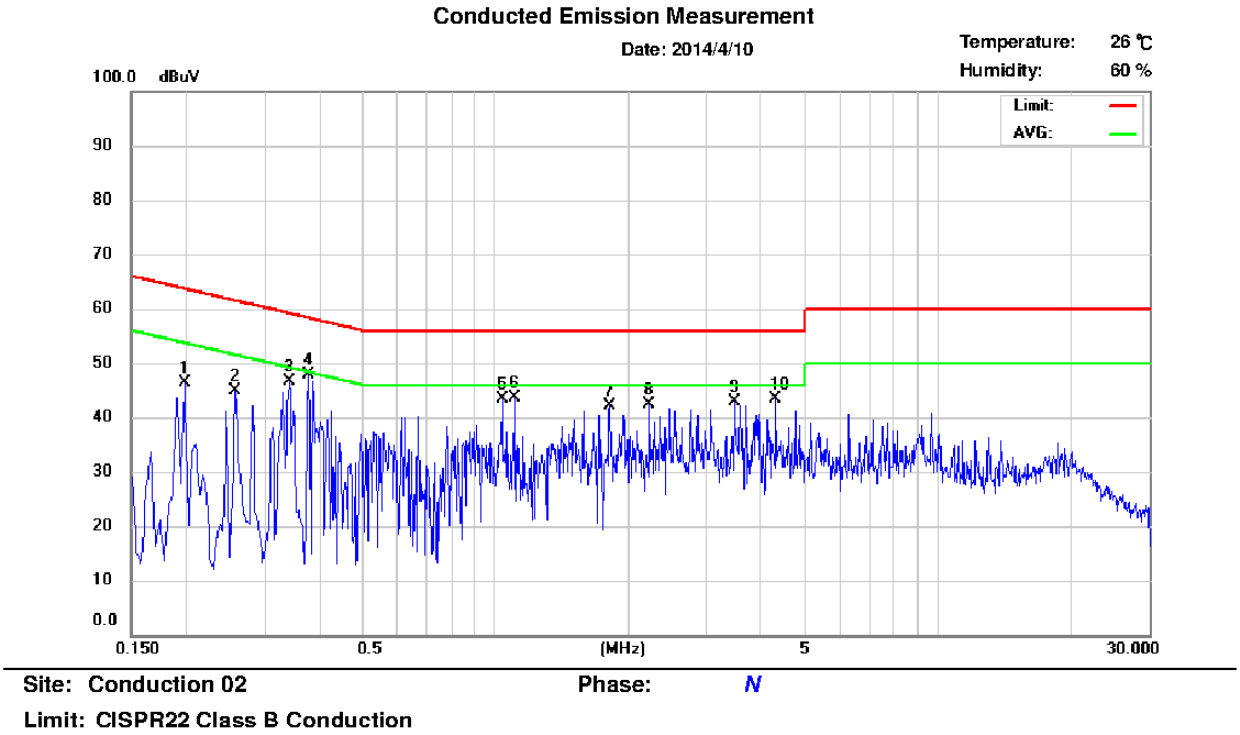
Operation Mode:	Operation Mode	Test Date:	2014/04/10
Test By:	Dino		



Site: Conduction 02 Phase: *L1*

Limit: CISPR22 Class B Conduction

No.	Frequency (MHz)	Correct Factor (dB)	QP Emission (dBuV)	QP Limit (dBuV)	QP Margin (dB)	AVG Emission (dBuV)	AVG Limit (dBuV)	AVG Margin (dB)	Note
1	0.186	9.68	48.70	64.21	-15.51	26.81	54.21	-27.40	
2	0.202	9.67	47.49	63.53	-16.04	28.62	53.53	-24.91	
3	0.250	9.68	41.35	61.76	-20.41	19.26	51.76	-32.50	
4	0.278	9.68	39.60	60.88	-21.28	19.08	50.88	-31.80	
5	0.422	9.69	39.48	57.41	-17.93	22.34	47.41	-25.07	
6	0.522	9.69	37.82	56.00	-18.18	20.42	46.00	-25.58	
7	0.626	9.70	34.94	56.00	-21.06	19.26	46.00	-26.74	
8	0.846	9.71	36.59	56.00	-19.41	21.22	46.00	-24.78	
9	2.462	9.77	32.59	56.00	-23.41	19.02	46.00	-26.98	
10	2.578	9.77	30.81	56.00	-25.19	17.92	46.00	-28.08	
11	3.010	9.79	32.50	56.00	-23.50	19.03	46.00	-26.97	



Site: Conduction 02 Phase: *N*

Limit: CISPR22 Class B Conduction

No.	Frequency (MHz)	Correct Factor (dB)	QP Emission (dBuV)	QP Limit (dBuV)	QP Margin (dB)	AVG Emission (dBuV)	AVG Limit (dBuV)	AVG Margin (dB)	Note
1	0.198	9.66	47.49	63.69	-16.20	27.83	53.69	-25.86	
2	0.258	9.67	40.43	61.50	-21.07	19.73	51.50	-31.77	
3	0.342	9.68	39.06	59.15	-20.09	20.56	49.15	-28.59	
4	0.378	9.68	38.68	58.32	-19.64	20.36	48.32	-27.96	
5	1.034	9.71	31.49	56.00	-24.51	13.92	46.00	-32.08	
6	1.106	9.71	31.47	56.00	-24.53	14.20	46.00	-31.80	
7	1.818	9.75	31.03	56.00	-24.97	15.07	46.00	-30.93	
8	2.234	9.76	28.85	56.00	-27.15	13.33	46.00	-32.67	
9	3.458	9.79	31.22	56.00	-24.78	15.67	46.00	-30.33	
10	4.310	9.80	30.06	56.00	-25.94	14.38	46.00	-31.62	

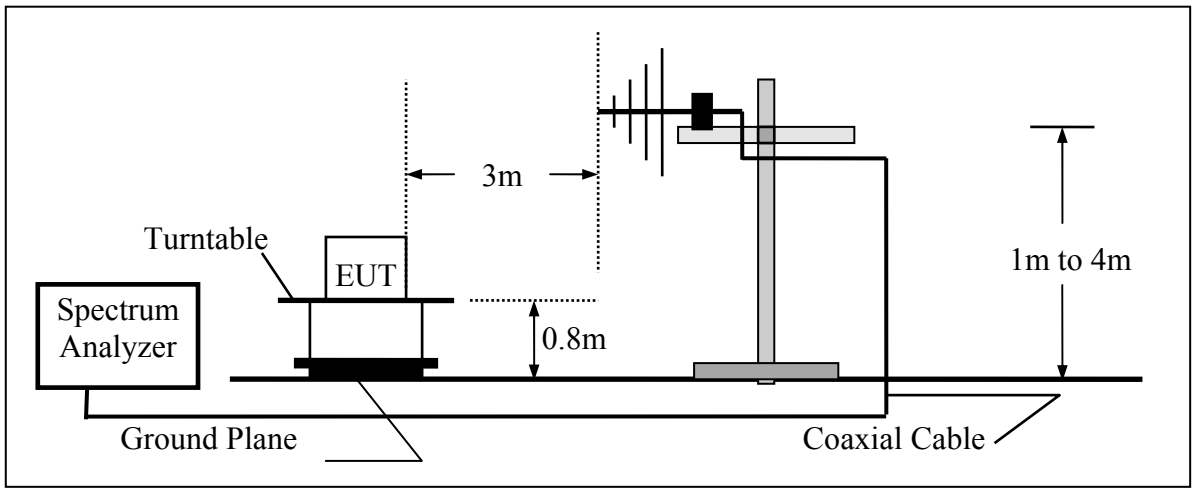
5. Radiated Emission Test (TX,RX)

5.1 Measurement Procedure

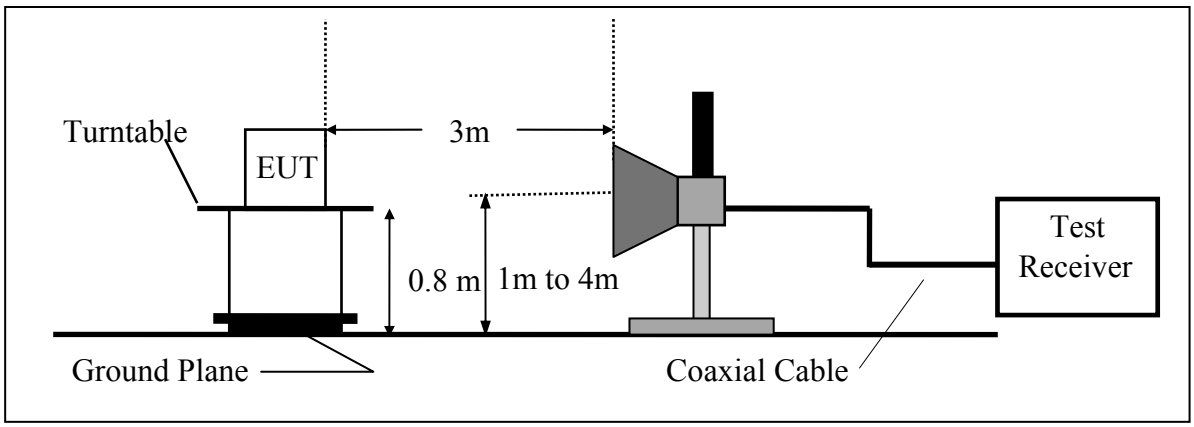
1. The EUT was placed on a turntable that is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measured were complete.

5.2 Test SET-UP (Block Diagram of Configuration)

(A) Radiated Emission Test Set-Up, Frequency Below 1000MHz



(B) Radiated Emission Test Set-UP Frequency Over 1 GHz



5.3 Measurement Equipment Used:

Chamber 14(966)					
EQUIPMENT TYPE	**MFR**	**MODEL NUMBER**	**SERIAL NUMBER**	**LAST CAL.**	**CAL DUE.**
Spectrum Analyzer 21(26.5GHz)	Agilent	N9010A	MY49060537	07/18/2013	07/17/2014
Spectrum Analyzer 20(6.5GHz)	Agilent	E4443A	MY48250315	05/26/2013	05/25/2014
Spectrum Analyzer 22(43GHz)	R&S	FSU43	100143	05/03/2013	05/02/2014
Loop Antenna9K-30M	A.H.SYSTEM	SAS-564	294	03/07/2013	03/06/2015
Bilog Antenna30-1G	Schaffner	CBL 6112B	2756	01/08/2014	01/07/2015
Horn antenna1-18G(06)	EMCO	3117	0006665	11/04/2013	11/03/2014
Horn antenna26-40G(05)	Com-power	AH-640	100A	01/09/2013	01/08/2015
Horn antenna18-26G(04)	Com-power	AH-826	081001	05/15/2013	05/14/2015
Preamplifier9-1000M	HP	8447D	NA	02/20/2014	02/19/2015
Preamplifier1-18G	MITEQ	AFS44-00101800-25-10P-44	1329256	07/18/2013	07/17/2014
Preamplifier1-26G	EM	EM01M26G	NA	02/20/2014	02/19/2015
Preamplifier26-40G	MITEQ	JS-26004000-27-5A	818471	05/08/2013	05/07/2015
Cable1-18G	HUBER SUHNER	Sucoflex 106	NA	02/17/2014	02/16/2015
Cable UP to 1G	HUBER SUHNER	RG 214/U	NA	10/14/2013	10/13/2014
SUCOFLEX 1GHz~40GHz cable	HUBER SUHNER	Sucoflex 102	27963/2&37421/2	10/03/2013	10/02/2015
2.4G Filter	Micro-Tronics	Brm50702	76	12/27/2013	12/26/2014

5.4 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor(if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CL - AG

Where	FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
	RA = Reading Amplitude	AG = Amplifier Gain
	AF = Antenna Factor	

5.5 Measurement Result

5.5.1 Fundamental Emission Measurement Result

Operation Mode	: TX mode	Test Date	: 2014/04/14
Fundamental Frequency	: 2403 MHz, 2443 MHz, 2481MHz	Test By	: Dino
Temp	: 25 ℃	Hum.	: 60%

CH Low:

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	2403.04	85.92	-7.06	78.86	114.00	-35.14	Peak	VERTICAL
1	2403.03	84.24	-7.06	77.18	114.00	-36.82	Peak	HORIZONTAL

CH Mid:

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	2443.01	85.01	-6.99	78.02	114.00	-35.98	Peak	VERTICAL
1	2443.04	84.13	-6.99	77.14	114.00	-36.86	Peak	HORIZONTAL

CH High:

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	2481.04	85.63	-6.92	78.71	114.00	-35.29	Peak	VERTICAL
1	2481.07	84.59	-6.92	77.67	114.00	-36.33	Peak	HORIZONTAL

Remark:

1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency

2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.

3 “F” denotes fundamental frequency; “H” denotes harmonics frequency. “S” denotes spurious frequency.

4 Measurement of data within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

5 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.

6 AV level = Peak reading – Duty Cycle Correction factor..

5.5.2 Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode	TX CH Low	Test Date	2014/04/14
Fundamental Frequency	2403 MHz	Test By	Dino
Temperature	25 ℃	Humidity	60 %

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	52.31	36.36	-12.24	24.12	40.00	-15.88	Peak	VERTICAL
2	64.92	36.32	-13.68	22.64	40.00	-17.36	Peak	VERTICAL
3	279.29	33.31	-11.61	21.70	46.00	-24.30	Peak	VERTICAL
4	284.14	32.84	-11.50	21.34	46.00	-24.66	Peak	VERTICAL
5	753.62	25.15	-2.86	22.29	46.00	-23.71	Peak	VERTICAL
6	856.44	26.17	-1.60	24.57	46.00	-21.43	Peak	VERTICAL
1	49.40	29.04	-12.13	16.91	40.00	-23.09	Peak	HORIZONTAL
2	284.14	32.47	-11.50	20.97	46.00	-25.03	Peak	HORIZONTAL
3	558.65	26.95	-6.67	20.28	46.00	-25.72	Peak	HORIZONTAL
4	801.15	26.16	-2.47	23.69	46.00	-22.31	Peak	HORIZONTAL
5	874.87	25.99	-1.25	24.74	46.00	-21.26	Peak	HORIZONTAL
6	911.73	25.34	-0.55	24.79	46.00	-21.21	Peak	HORIZONTAL

Remark:

1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency

2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.

3 “F” denotes fundamental frequency; “H” denotes harmonics frequency. “S” denotes spurious frequency.

4 Measurement of data within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

5 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.

6 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode	TX CH Mid	Test Date	2014/04/14
Fundamental Frequency	2443 MHz	Test By	Dino
Temperature	25 ℃	Humidity	60 %

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	53.28	36.82	-12.30	24.52	40.00	-15.48	Peak	VERTICAL
2	62.98	36.22	-13.30	22.92	40.00	-17.08	Peak	VERTICAL
3	279.29	32.35	-11.61	20.74	46.00	-25.26	Peak	VERTICAL
4	284.14	32.84	-11.50	21.34	46.00	-24.66	Peak	VERTICAL
5	660.50	26.57	-4.80	21.77	46.00	-24.23	Peak	VERTICAL
6	867.11	25.83	-1.40	24.43	46.00	-21.57	Peak	VERTICAL
1	47.46	28.84	-12.22	16.62	40.00	-23.38	Peak	HORIZONTAL
2	284.14	31.96	-11.50	20.46	46.00	-25.54	Peak	HORIZONTAL
3	559.62	27.01	-6.64	20.37	46.00	-25.63	Peak	HORIZONTAL
4	765.26	25.21	-2.76	22.45	46.00	-23.55	Peak	HORIZONTAL
5	839.95	25.07	-1.87	23.20	46.00	-22.80	Peak	HORIZONTAL
6	933.07	24.74	-0.14	24.60	46.00	-21.40	Peak	HORIZONTAL

Remark:

1. Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency
2. Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.
3. “F” denotes fundamental frequency; “H” denotes harmonics frequency. “S” denotes spurious frequency.
4. Measurement of data within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.
6. Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode	TX CH High	Test Date	2014/04/14
Fundamental Frequency	2481 MHz	Test By	Dino
Temperature	25 ℃	Humidity	60 %

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	52.31	36.55	-12.24	24.31	40.00	-15.69	Peak	VERTICAL
2	62.01	36.78	-13.10	23.68	40.00	-16.32	Peak	VERTICAL
3	279.29	33.08	-11.61	21.47	46.00	-24.53	Peak	VERTICAL
4	284.14	32.71	-11.50	21.21	46.00	-24.79	Peak	VERTICAL
5	714.82	25.18	-3.82	21.36	46.00	-24.64	Peak	VERTICAL
6	903.97	24.47	-0.70	23.77	46.00	-22.23	Peak	VERTICAL
1	49.40	29.30	-12.13	17.17	40.00	-22.83	Peak	HORIZONTAL
2	284.14	32.33	-11.50	20.83	46.00	-25.17	Peak	HORIZONTAL
3	652.74	25.11	-4.93	20.18	46.00	-25.82	Peak	HORIZONTAL
4	767.20	26.49	-2.75	23.74	46.00	-22.26	Peak	HORIZONTAL
5	880.69	24.79	-1.14	23.65	46.00	-22.35	Peak	HORIZONTAL
6	49.40	29.30	-12.13	17.17	40.00	-22.83	Peak	HORIZONTAL

Remark:

1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency

2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.

3 “F” denotes fundamental frequency; “H” denotes harmonics frequency. “S” denotes spurious frequency.

4 Measurement of data within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

5 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.

6 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode	: TX CH Low	Test Date	: 2014/04/14
Fundamental Frequency	: 2403 MHz	Test By	: Dino
Temp	: 25 ℃	Hum.	: 60%

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	1203.00	47.40	-11.62	35.78	74.00	-38.22	Peak	VERTICAL
2	2390.00	49.54	-7.09	42.45	74.00	-31.55	Peak	VERTICAL
3	2400.00	49.57	-7.07	42.50	74.00	-31.50	Peak	VERTICAL
4	4806.00	33.44	1.28	34.72	74.00	-39.28	Peak	VERTICAL
5	7209.00	---						VERTICAL
6	9612.00	---						VERTICAL
7	12015.00	---						VERTICAL
1	1203.00	46.53	-11.62	34.91	74.00	-39.09	Peak	HORIZONTAL
2	2390.00	48.00	-7.09	40.91	74.00	-33.09	Peak	HORIZONTAL
3	2400.00	48.61	-7.07	41.54	74.00	-32.46	Peak	HORIZONTAL
4	4806.00	33.31	1.28	34.59	74.00	-39.41	Peak	HORIZONTAL
5	7209.00	---						HORIZONTAL
6	9612.00	---						HORIZONTAL
7	12015.00	---						HORIZONTAL

Remark:

1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency
2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.
3 “F” denotes fundamental frequency; “H” denotes harmonics frequency. “S” denotes spurious frequency.
4 Measurement of data within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.
6 AV level = Peak reading – Duty Cycle Correction factor..

Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode	: TX CH Mid	Test Date	: 2014/04/14
Fundamental Frequency	: 2443 MHz	Test By	: Dino
Temp	: 25 ℃	Hum.	: 60%

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	1224.00	47.89	-11.57	36.32	74.00	-37.68	Peak	VERTICAL
2	4886.00	34.16	1.54	35.70	74.00	-38.30	Peak	VERTICAL
3	7329.00	---						VERTICAL
4	9772.00	---						VERTICAL
5	12215.00	---						VERTICAL
1	1224.00	46.70	-11.57	35.13	74.00	-38.87	Peak	HORIZONTAL
2	4886.00	33.76	1.54	35.30	74.00	-38.70	Peak	HORIZONTAL
3	7329.00	36.10	14.23	50.33	74.00	-23.67	Peak	HORIZONTAL
4	9772.00	---						HORIZONTAL
5	12215.00	---						HORIZONTAL

Remark:

1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency
2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.
3 “F” denotes fundamental frequency; “H” denotes harmonics frequency. “S” denotes spurious frequency.
4 Measurement of data within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.
6 AV level = Peak reading – Duty Cycle Correction factor..

Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode	: TX CH High	Test Date	: 2014/04/14
Fundamental Frequency	: 2481 MHz	Test By	: Dino
Temp	: 25 ℃	Hum.	: 60%

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	1238.00	47.50	-11.53	35.97	74.00	-38.03	Peak	VERTICAL
2	2483.50	48.82	-6.90	41.92	74.00	-32.08	Peak	VERTICAL
3	2484.04	52.26	-6.90	45.36	74.00	-28.64	Peak	VERTICAL
4	4962.00	33.55	1.81	35.36	74.00	-38.64	Peak	VERTICAL
5	7443.00	---						VERTICAL
6	9772.00	---						VERTICAL
7	12405.00	---						VERTICAL
1	1238.00	48.23	-11.53	36.70	74.00	-37.30	Peak	HORIZONTAL
2	2483.50	49.33	-6.90	42.43	74.00	-31.57	Peak	HORIZONTAL
3	2488.87	50.38	-6.89	43.49	74.00	-30.51	Peak	HORIZONTAL
4	4962.00	33.52	1.81	35.33	74.00	-38.67	Peak	HORIZONTAL
5	7443.00	---						HORIZONTAL
6	9772.00	---						HORIZONTAL
7	12405.00	---						HORIZONTAL

Remark:

1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency
2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.
3 “F” denotes fundamental frequency; “H” denotes harmonics frequency. “S” denotes spurious frequency.
4 Measurement of data within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.
6 AV level = Peak reading – Duty Cycle Correction factor..

6. 20 dB Band Width Measurement

6.1 Measurement Procedure

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Set ETU normal operating mode.
3. Set SPA Center Frequency = fundamental frequency, RBW = 100kHz, VBW = 300kHz, Span =500kHz.
4. Set SPA Max hold. Mark peak, -20dB.

6.2 Test SET-UP (Block Diagram of Configuration)

Same as 4.2 Radiated Emission Measurement.

6.3 Measurement Equipment Used:

Same as 4.2 Radiated Emission Measurement.

6.4 Measurement Results:

2403 Channel = 0.2927 MHz

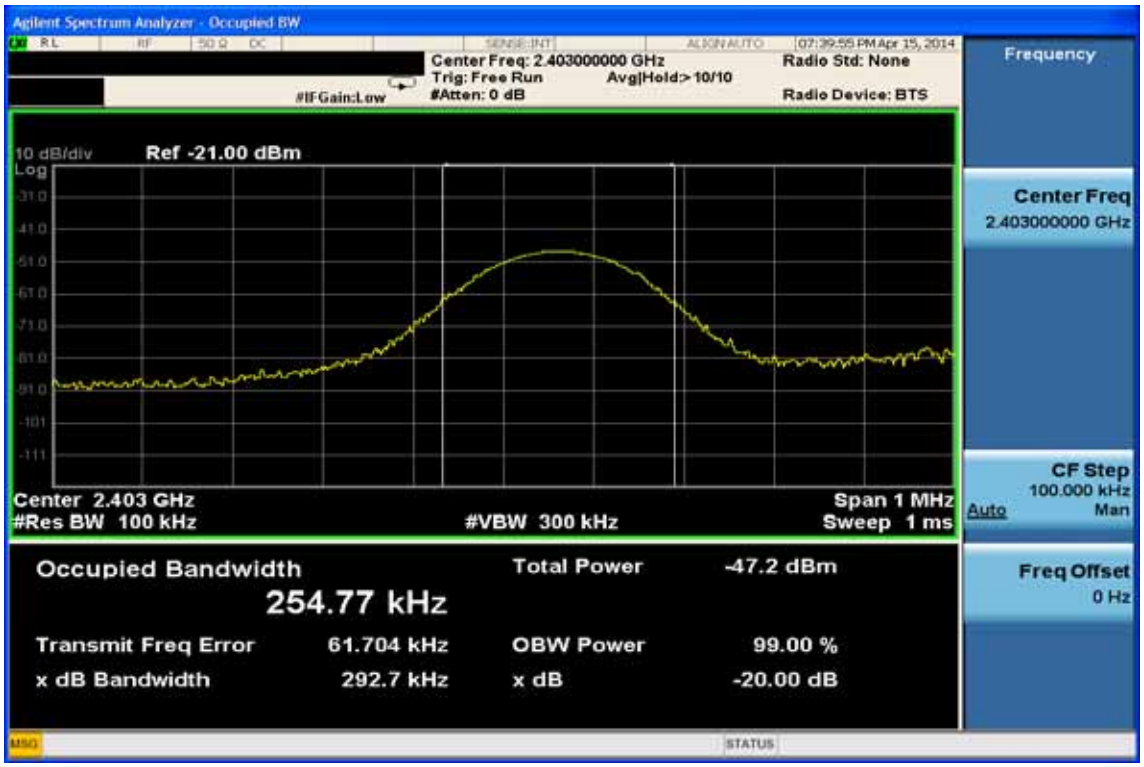
2443 Channel = 0.2873 M Hz

2481 Channel = 0.2852 M Hz

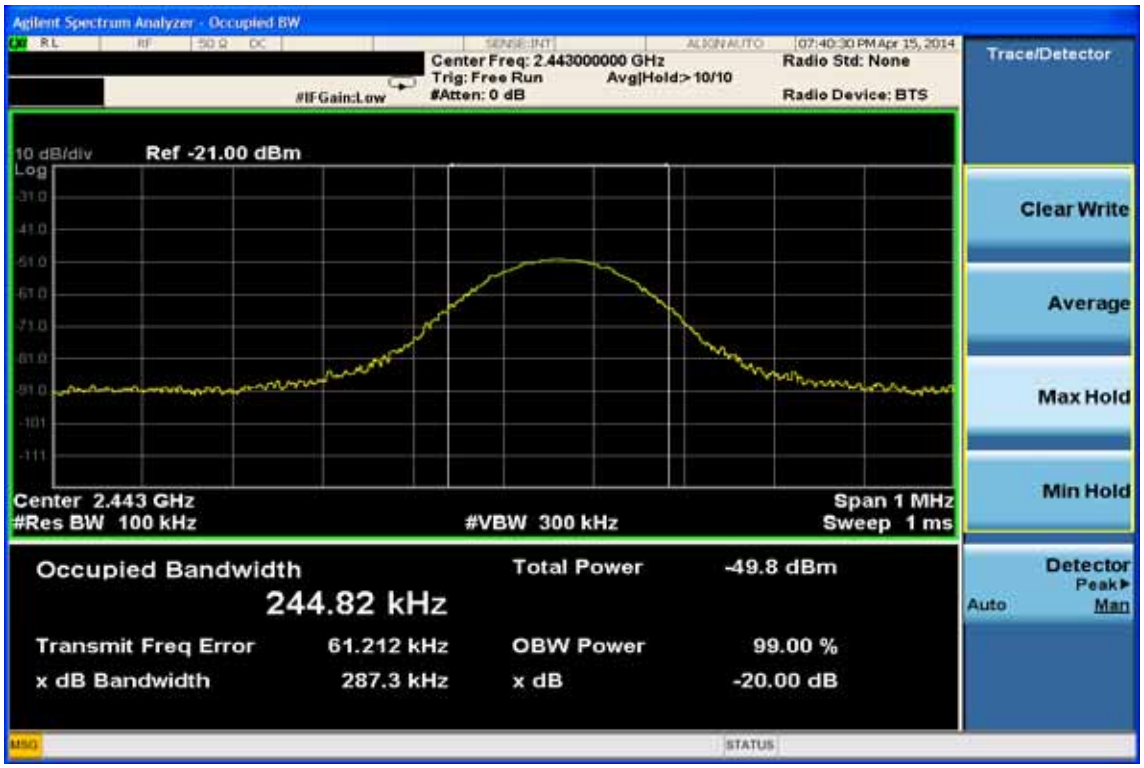
Refer to attached data chart.

20dB Band Width test Plot

CH Low



CH Mid



CH High


Agilent Spectrum Analyzer - Occupied BW
RL
RF
50 Ω
DC
SENSE:INT
ALIGN AUTO
07:41:01 PM Apr 15, 2014
Center Freq: 2.481000000 GHz
Trig: Free Run
Avg|Hold:>10/10
#IFGain:Low
#Atten: 0 dB
Radio Std: None
Radio Device: BTS
Frequency
10 dB/div
Log
Ref -21.00 dBm
31.0
41.0
51.0
61.0
71.0
81.0
91.0
-101
-111
Center Freq
2.481000000 GHz
CF Step
100.000 kHz
Auto
Man
Center 2.481 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 1 MHz
Sweep 1 ms
Occupied Bandwidth
245.60 kHz
Total Power
-48.0 dBm
Freq Offset
0 Hz
Transmit Freq Error
63.863 kHz
OBW Power
99.00 %
x dB Bandwidth
285.2 kHz
x dB
-20.00 dB
MSG
STATUS

7. 99% Band Width Measurement

7.1 Measurement 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=1% of the approximate emission bandwidth, VBW = 3 times RBW, Span= approximately 20dB below the peak level. Sweep=auto

4 Turn on the 99% bandwidth function, max reading.

5 Repeat above procedures until all frequency measured were complete.

7.2 Test SET-UP (Block Diagram of Configuration)

Same as 4.2 Radiated Emission Measurement.

7.3 Measurement Equipment Used:

Same as 4.2 Radiated Emission Measurement.

7.4 Measurement Results:

2403 Channel = 0.25477 MHz

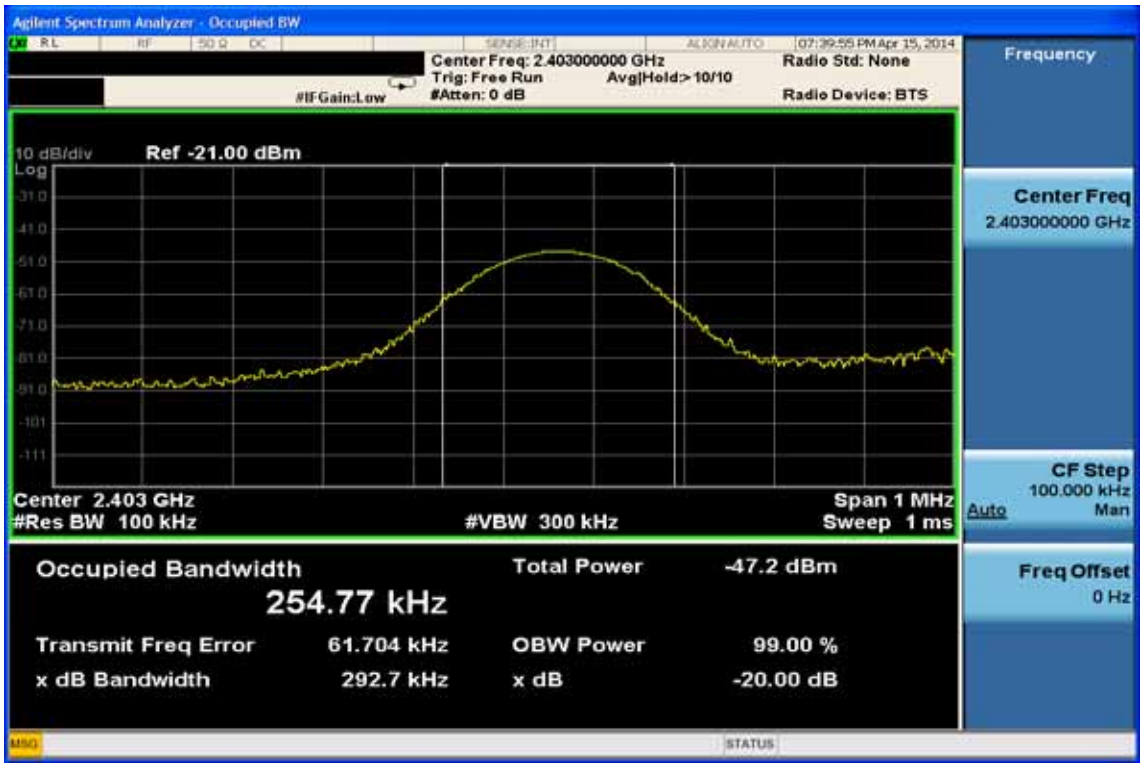
2443 Channel = 0.24482 MHz

2481 Channel = 0.24560 MHz

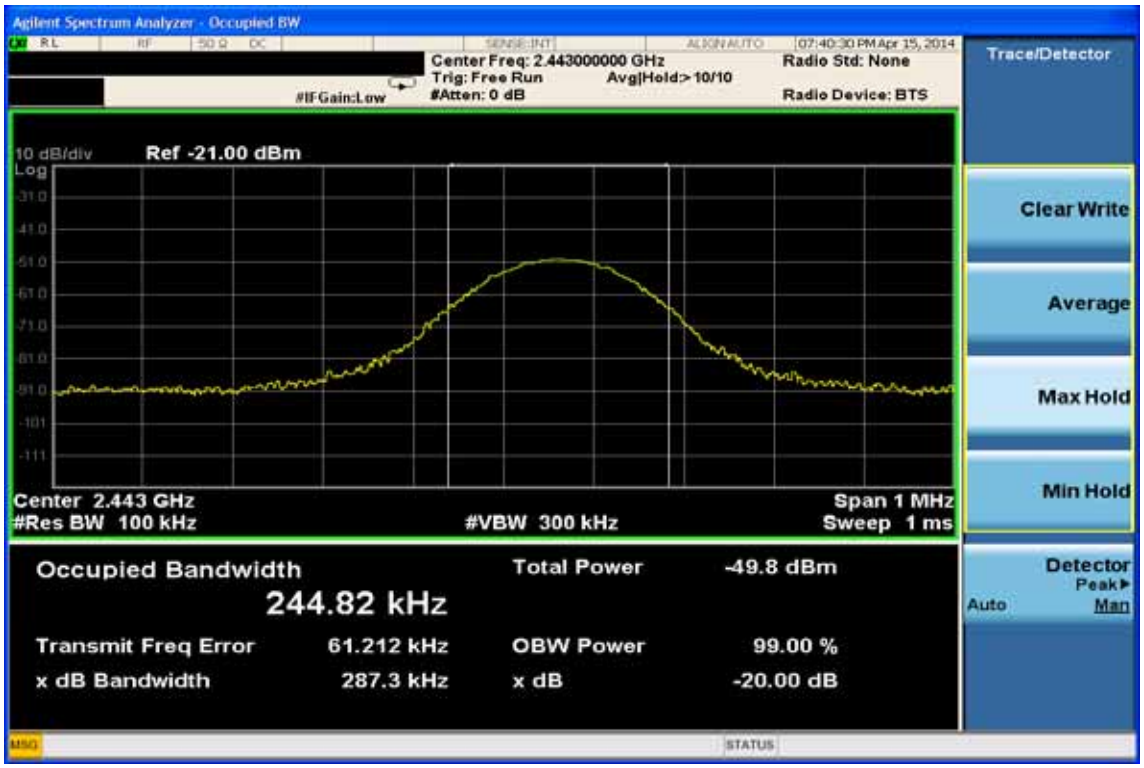
Refer to attached data chart.

99% Band Width test Plot

CH Low



CH Mid



CH High


Agilent Spectrum Analyzer - Occupied BW
RL
RF
50 Ω
DC
SENSE:INT
ALIGN AUTO
07:41:01 PM Apr 15, 2014
Center Freq: 2.481000000 GHz
Trig: Free Run
Avg|Hold:>10/10
#IFGain:Low
#Atten: 0 dB
Radio Std: None
Radio Device: BTS
Frequency
10 dB/div
Log
Ref -21.00 dBm
31.0
41.0
51.0
61.0
71.0
81.0
91.0
-101
-111
Center Freq
2.481000000 GHz
CF Step
100.000 kHz
Auto
Man
Center 2.481 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 1 MHz
Sweep 1 ms
Occupied Bandwidth
245.60 kHz
Total Power
-48.0 dBm
Freq Offset
0 Hz
Transmit Freq Error
63.863 kHz
OBW Power
99.00 %
x dB Bandwidth
285.2 kHz
x dB
-20.00 dB
MSG
STATUS