TEST REPORT

of

FCC Part 15 Subpart C

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

Product :	**VOICE COMMAND WATCH**
Brand:	**GUESS**
Model:	**C0001Gx / C0002Mx (x=A~Z,0~9 or blank)**
Model Difference:	**N/A**
FCC Rule Part:	**§15.247, Cat: DSS**

Applicant:	**Sequel AG**
Address:	**Genear-Guisan- Strasse 8, 5th Floor, Zug, Switzerland 6300**

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, Hsin Ho Rd.,
Lung-Tan Dist., Tao Yuan City 325, Taiwan
*Tel : 886-3-407-1718; Fax: 886-3-407-1738

Report No.: **ISL-14LR285FCDSS-MA**
Issue Date : **2015/09/04**

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.
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VERIFICATION OF COMPLIANCE

Applicant:	Sequel AG
Product Description:	VOICE COMMAND WATCH
Brand Name:	GUESS
Model No.:	C0001Gx / C0002Mx (x=A~Z,0~9 or blank)
Model Difference:	N/A
Date of test:	2014/11/13 ~ 2015/05/04
Date of EUT Received:	2014/11/13

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:***	2015/09/04
	Dion Chang / Engineer		
Prepared By:	Eva Kao	***Date:***	2015/09/04
	Eva Kao / Technical Supervisor		
Approved By:	Vincent Su	***Date:***	2015/09/04
	Vincent Su / Technical Manager		

Version

Version No.	Date	Description
00	2015/09/04	Initial creation of document

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1. GENERAL INFORMATION

1.1. Product Description

General:

Product Name	VOICE COMMAND WATCH
Brand Name	GUESS
Model Name	C0001Gx / C0002Mx (x=A~Z,0~9 or blank)
Model Difference	N/A
USB port	one provided for battery charge
Power Supply	3.7Vdc from battery
Product SW/HW version	1.5 / 1.0
Radio SW/HW version	1.5 / 1.0
Test SoftWare Version	BlueSuite 2.5
RF power setting in TEST SoftWare	100
FVIN (Firmware Version Identification Number)	2.28

Bluetooth:

Frequency Range:	2402 – 2480MHz	
Bluetooth Version:	V2.1 + EDR	V4.0
Channel number:	79 channels	40 channels, 2MHz step
Modulation type	GFSK +π / 4DQPSK + 8DPSK	Wide band Modulation (GFSK)
Tune-Up Power	1dBm +/-1.5 dBm	0dBm +/-1.5 dBm
Transmit Power:	2.19 dBm Peak	0.57 dBm Peak
Dwell Time:	<= 0.4s	N/A
Antenna Designation:	Chip Antenna , 2.2dBi	

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 to comply with Section 15.247 of the FCC Part 15C, Subpart C Rules. And to comply with Industry Canada RSS-210 issue 8: Dec. 2010 Annex 8.

1.3. Test Methodology

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4: 2014, ANSI C63.10: 2013 and RSS-Gen issue 4: 2014. Radiated testing was performed at an antenna to EUT distance 3 meters.

Tested in accordance with FCC Public Notice DA 00-705

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, Hsin Ho Rd., Lung-Tan Dist., Tao Yuan City 325, Taiwan which are constructed and calibrated to meet the FCC requirements in documents ANSI C63.4: 2014. FCC Registration Number is: 872200; Designation 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 EUT (Transmitter) was tested with a test program to fix the TX/RX frequency that was for the purpose of the measurements. For more information please see test data and APPENDIX 1 for set-up photographs.

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 5 and 7 of ANSI C63.4: 2014 and RSS-Gen issue 4: 2014. 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/1.5m(Frequency above 1GHz) 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 and measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made “while keeping the antenna in the ‘cone of radiation’ from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response.” is still within the 3dB illumination BW of the measurement antenna. according to the requirements in Section 6 and 11 of ANSI C63.10: 2013 and DA 00-705.

2.4. Configuration of Tested System

Fig. 2-1 Configuration of Tested System (Fixed channel)

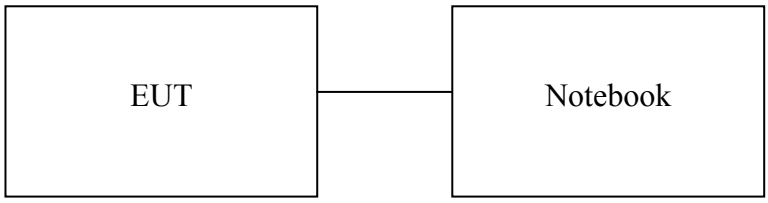


Table 1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/ Type No.	Series No.	Data Cable	Power Cord
1	Notebook	Dell	D620	N/A	Shield	Non-shield

3. SUMMARY OF TEST RESULTS

FCC Rules	Description Of Test	Result
§15.207(a)/ RSS-Gen §8.8	AC Power line Conducted Emission	Compliant
§15.247(b)(1)/ RSS-210 issue 8,§A8.4(2)	Peak Output Power	Compliant
§15.247(d) RSS-210 issue 8,§A8.5	100 KHz Bandwidth Of Frequency Band Edges	Compliant
§15.247(c) RSS-Gen §8.9 RSS-210 issue 8,§A2.9	TX Spurious Emission	Compliant
§15.247(a)(1)/ RSS-210 issue 8,§A8.1(b)	Frequency Separation	Compliant
§15.247(a)(1)(iii)/ RSS-210 issue 8,§A8.1(d)	Number of hopping frequency	Compliant
§15.247(a)(1)(ii)/ RSS-210 issue 8,§A8.1(d)	Time of Occupancy	Compliant
§15.247(a)(1) RSS-Gen §6.6 RSS210 issue ,§A8.1(b)	20dB Bandwidth & 99% Power Bandwidth	Compliant
§15.203, §15.247(c)/ RSS-GEN 8.3, RSS-210 issue 8,§A8.4	Antenna Requirement	Compliant

4. DESCRIPTION OF TEST MODES

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

Channel low (2402MHz)、mid (2441MHz) and high (2480MHz) with each modulation were chosen for full testing.

The worst case BDR mode was reported for Radiated Emission.

5. AC POWER LINE CONDUCTED EMISSION TEST

5.1. Standard Applicable:

According to §15.207 and RSS-Gen §8.8, frequency range within 150KHz to 30MHz shall not exceed the Limit table as below.

Frequency range MHz	Limits dB(uV)	
	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

Note

1.The lower limit shall apply at the transition frequencies

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

5.2. Measurement Equipment Used:

Conducted Emission Test Site					
EQUIPMENT TYPE	**MFR**	**MODEL NUMBER**	**SERIAL NUMBER**	**LAST CAL.**	**CAL DUE.**
Conduction 04-3 Cable	WOKEN	CFD 300-NL	Conduction 04 -3	07/24/2014	07/23/2015
EMI Receiver 17	Rohde & Schwarz	ESCI 7	100887	09/03/2014	09/02/2015
LISN 18	ROHDE & SCHWARZ	ENV216	101424	02/11/2015	02/10/2016
LISN 19	ROHDE & SCHWARZ	ENV216	101425	03/12/2015	03/11/2016

5.3. EUT Setup:

1. The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI C63.4-2009.
2. The AC/DC Power adaptor of EUT was plug-in LISN. The EUT was placed flushed with the rear of the table.
3. The LISN was connected with 120Vac/60Hz power source.

5.4. 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.

5.5. Measurement Result:

The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. Significant peaks are then marked as shown on the following data page, and these signals are then quasi-peaked.

AC POWER LINE CONDUCTED EMISSION TEST DATA

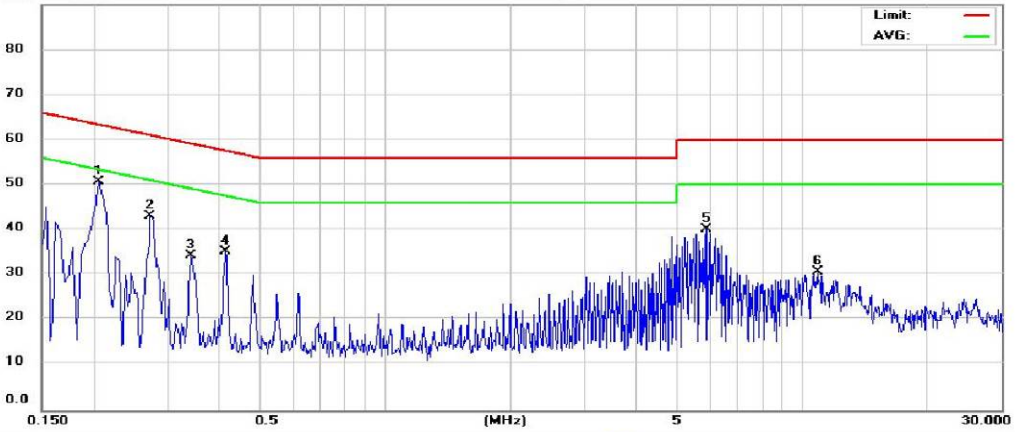
Operation Mode:	Operation Mode	Test Date:	2015/03/30
Test By:	Dino		

Address:No. 120, Lane 180, Hsin Ho Rd., Lung-Tan Dist.,
Tao Yuan City 325, Taiwan.
Tel:03-4071718

Conducted Emission Measurement

File :14LR285 Data :#1 Date: 2015/3/30 Time: 下午 04:21:29

operator:
Temperature: 26 ℃
Humidity: 54 %



Site: Conduction 04
Limit: Conduction
Company:
EUT Model:
Execute Program:
Note:

Phase: L1
Power:
Witness:

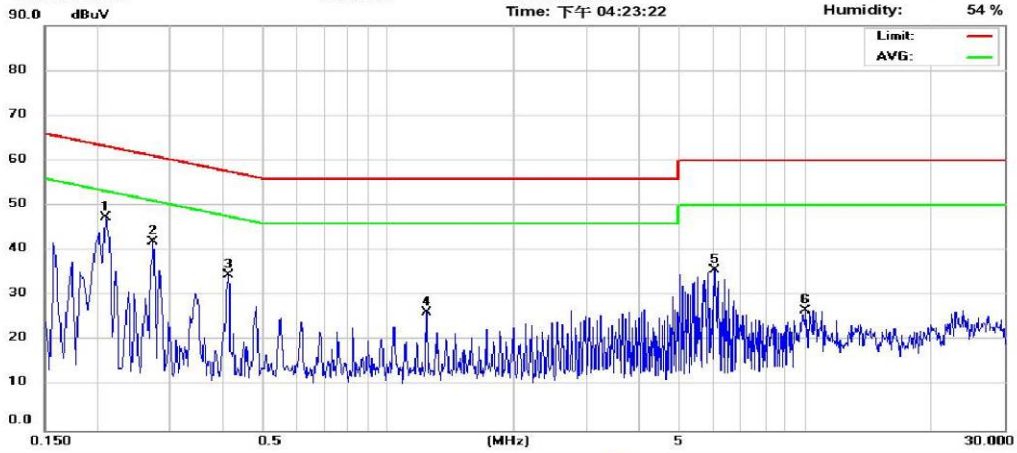
No.	Frequency (MHz)	Correct Factor (dB)	QP Emission (dBuV)	QP Limit (dBuV)	QP Margin (dB)	AVG Emission (dBuV)	AVG Limit (dBuV)	AVG Margin (dB)	Note
1	0.206	9.58	50.19	63.37	-13.18	38.29	53.37	-15.08	
2	0.274	9.58	42.06	61.00	-18.94	30.68	51.00	-20.32	
3	0.342	9.58	33.42	59.15	-25.73	24.95	49.15	-24.20	
4	0.414	9.58	33.59	57.57	-23.98	23.57	47.57	-24.00	
5	5.914	9.67	33.02	60.00	-26.98	20.12	50.00	-29.88	
6	10.870	9.77	23.21	60.00	-36.79	16.63	50.00	-33.37	

Address:No. 120, Lane 180, Hsin Ho Rd., Lung-Tan Dist.,
Tao Yuan City 325, Taiwan.
Tel:03-4071718

Conducted Emission Measurement

File :14LR285 Data :#2 Date: 2015/3/30 Time: 下午 04:23:22

operator:
Temperature: 26 ℃
Humidity: 54 %



Site: Conduction 04
Limit: Conduction
Company:
EUT Model:
Execute Program:
Note:

Phase: N
Power:
Witness:

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	0.210	9.60	46.15	63.21	-17.06	34.36	53.21	-18.85	
2	0.274	9.60	41.60	61.00	-19.40	30.15	51.00	-20.85	
3	0.414	9.59	33.27	57.57	-24.30	23.26	47.57	-24.31	
4	1.238	9.61	22.11	56.00	-33.89	15.34	46.00	-30.66	
5	6.058	9.69	33.04	60.00	-26.96	20.97	50.00	-29.03	
6	10.050	9.76	22.93	60.00	-37.07	16.05	50.00	-33.95	

6. PEAK OUTPUT POWER MEASUREMENT

6.1. Standard Applicable:

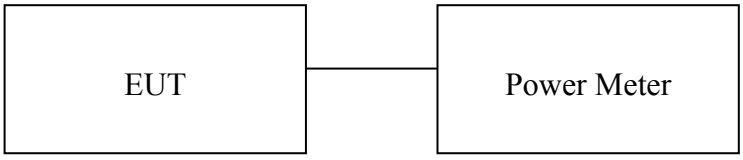
According to §15.247(b)(1), For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 hopping channels, and all frequency hopping systems in the 5725-5850MHz band: 1Watt. For all other frequency hopping systems in the 2400 – 2483.5MHz band: 0.125 Watts.

According to RSS-210 issue 8,§A8.4(2), For frequency hopping systems operating in the band 2400-2483.5 MHz and employing at least 75 hopping channels, the maximum peak conducted output power shall not exceed 1 W; for all other frequency hopping systems in the band, the maximum peak conducted output power shall not exceed 0.125 W.

6.2. Measurement Equipment Used:

Conducted Emission Test Site					
EQUIPMENT TYPE	**MFR**	**MODEL NUMBER**	**SERIAL NUMBER**	**LAST CAL.**	**CAL DUE.**
Power Meter 05	Anritsu	ML2495A	1116010	05/08/2014	05/07/2015
Power Sensor 05	Anritsu	MA2411B	34NKF50	05/08/2014	05/07/2015
Power Sensor 06	DARE	RPR3006W	13I00030SNO33	10/31/2014	10/30/2015
Power Sensor 07	DARE	RPR3006W	13I00030SNO34	10/31/2014	10/30/2015
Temperature Chamber	KSON	THS-B4H100	2287	03/17/2015	03/16/2016
DC Power supply	ABM	8185D	N/A	07/16/2014	07/15/2015
AC Power supply	EXTECH	CFC105W	NA	12/27/2014	12/26/2015
Attenuator	Woken	Watt-65m3502	11051601	NA	NA
Splitter	MCLI	PS4-199	12465	12/27/2013	12/26/2015
Spectrum analyzer	Agilent	N9030A	MY51360021	05/02/2014	05/01/2015

6.3. .Test Set-up:



6.4. 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 power meter or spectrum. (Channel power function, RBW, VBW = 1MHz)
3. Record the max. reading.
4. Repeat above procedures until all frequency measured were complete.

6.5. Measurement Result:

BDR Mode

Channel	Peak Reading Power (dBm)	Cable Loss	Output Power (dBm)	Output Power (W)	Limit (W)
Low	1.66	0.00	1.66	0.00147	1
Mid	2.03	0.00	2.03	0.00160	1
High	2.19	0.00	2.19	0.00166	1

EDR 2M Mode

Channel	Peak Reading Power (dBm)	Cable Loss	Output Power (dBm)	Output Power (W)	Limit (W)
Low	0.67	0.00	0.67	0.00109	0.125
Mid	0.76	0.00	0.76	0.00119	0.125
High	0.96	0.00	0.96	0.00125	0.125

EDR 3M Mode

Channel	Peak Reading Power (dBm)	Cable Loss	Output Power (dBm)	Output Power (W)	Limit (W)
Low	0.67	0.00	0.67	0.00117	0.125
Mid	1.06	0.00	1.06	0.00128	0.125
High	1.27	0.00	1.27	0.00134	0.125

Offset: 0.5dB

7. 100KHz BANDWIDTH OF BAND EDGES MEASUREMENT

7.1. Standard Applicable:

According to §15.247(d), in any 100 KHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator in operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100KHz bandwidth within the band that contains the highest level of the desired power, In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in15.209(a).

According to RSS-210 issue 8,§A8.5, In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the radio frequency power that is produced 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. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under section A8.4(4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

7.2. Measurement Equipment Used:

7.2.1. Conducted Emission at antenna port:

Refer to section 6.2 for details.

7.2.2. Radiated emission:

Chamber 14(966)					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer 21(26.5GHz)	Agilent	N9010A	MY49060537	07/29/2014	07/28/2015
Spectrum Analyzer 20(6.5GHz)	Agilent	E4443A	MY48250315	05/26/2014	05/25/2015
Spectrum Analyzer 22(43GHz)	R&S	FSU43	100143	05/07/2014	05/06/2015
Loop Antenna9K-30M	A.H.SYSTEM	SAS-564	294	03/07/2015	03/06/2017
Bilog Antenna30-1G	Schaffner	CBL 6112B	2756	12/30/2014	12/29/2015
Horn antenna1-18G	ETS	3117	00066665	11/27/2014	11/26/2015
Horn antenna26-40G(05)	Com-power	AH-640	100A	01/21/2015	01/20/2017
Horn antenna18-26G(04)	Com-power	AH-826	081001	05/15/2013	05/14/2015
Preamplifier9-1000M	HP	8447D	NA	03/12/2015	03/11/2016
Preamplifier1-18G	MITEQ	AFS44-00101800-25-10P-44	1329256	07/30/2014	07/29/2015
Preamplifier1-26G	EM	EM01M26G	NA	03/11/2015	03/10/2016
Preamplifier26-40G	MITEQ	JS-26004000-27-5A	818471	05/08/2013	05/07/2015
Cable1-18G	HUBER SUHNER	Sucoflex 106	NA	12/02/2014	12/01/2015
Cable UP to 1G	HUBER SUHNER	RG 214/U	NA	10/17/2014	10/16/2015
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	12/27/2014	12/26/2015

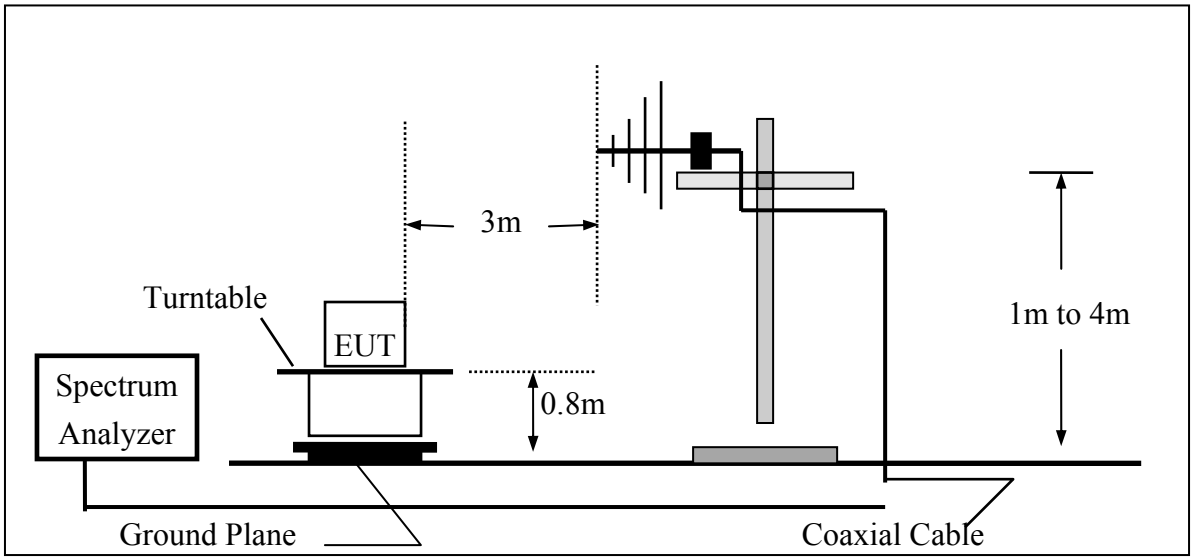
7.3. Test SET-UP:

7.3.1. Conducted Emission at antenna port:

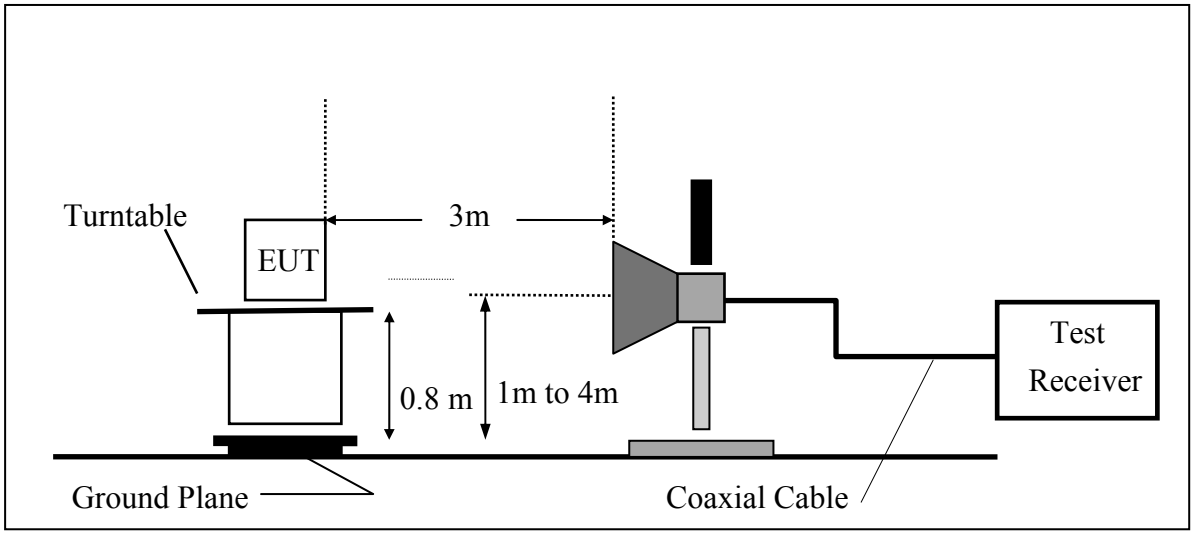
Refer to section 6.3 for details.

7.3.2. Radiated emission:

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



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



7.4. 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 center frequency of spectrum analyzer = operating frequency.
4. Set the spectrum analyzer as RBW, VBW=100KHz, Span=25MHz, Sweep = auto
5. Mark Peak, 2.390GHz and 2.4835GHz and record the max. level.
6. Repeat above procedures until all frequency measured were complete.

7.5. 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	

7.6. Measurement Result:

Note: Refer to next page spectrum analyzer data chart and tabular data sheets.

Radiated Emission: (BDR Hopping mode)

Operation Mode	TX CH Low	Test Date	2015/03/18
Fundamental Frequency	2402 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	2323.58	50.88	-10.92	39.96	74.00	-34.04	Peak	VERTICAL
2	2390.00	48.49	-10.68	37.81	74.00	-36.19	Peak	VERTICAL
3	2400.00	57.96	-10.66	47.30	74.00	-26.70	Peak	VERTICAL
4	2402.07	97.46	-10.64	86.82	--	F	Peak	VERTICAL
1	2317.72	51.55	-10.95	40.60	74.00	-33.40	Peak	HORIZONTAL
2	2390.00	49.95	-10.68	39.27	74.00	-34.73	Peak	HORIZONTAL
3	2400.00	61.61	-10.66	50.95	74.00	-23.05	Peak	HORIZONTAL
4	2402.07	100.45	-10.64	89.81	--	F	Peak	HORIZONTAL

Operation Mode	TX CH High	Test Date	2015/03/18
Fundamental Frequency	2480 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	2483.50	54.80	-10.34	44.46	74.00	-29.54	Peak	VERTICAL
1	2483.50	57.30	-10.34	46.96	74.00	-27.04	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 Emission (EDR 2M Hopping mode):

Operation Mode	TX CH Low	Test Date	2015/03/18
Fundamental Frequency	2402 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	2353.43	50.62	-10.82	39.80	74.00	-34.20	Peak	VERTICAL
2	2390.00	48.29	-10.68	37.61	74.00	-36.39	Peak	VERTICAL
3	2400.00	66.00	-10.66	55.34	74.00	-18.66	Peak	VERTICAL
4	2400.00	46.00	-10.66	35.34	54.00	-18.66	Average	VERTICAL
5	2402.07	95.91	-10.64	85.27	--	F	Peak	VERTICAL
1	2311.12	52.12	-10.98	41.14	74.00	-32.86	Peak	HORIZONTAL
2	2390.00	49.10	-10.68	38.42	74.00	-35.58	Peak	HORIZONTAL
3	2400.00	69.70	-10.66	59.04	74.00	-14.96	Peak	HORIZONTAL
4	2400.00	49.70	-10.66	39.04	54.00	-14.96	Average	HORIZONTAL
5	2402.16	98.70	-10.64	88.06	--	F	Peak	HORIZONTAL

Operation Mode	TX CH High	Test Date	2015/03/18
Fundamental Frequency	2480 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	2483.50	49.19	-10.34	38.85	74.00	-35.15	Peak	VERTICAL
2	2492.67	53.96	-10.32	43.64	74.00	-30.36	Peak	VERTICAL
1	2483.50	55.68	-10.34	45.34	74.00	-28.66	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 Emission (EDR 3M Hopping mode):

Operation Mode	TX CH Low	Test Date	2015/03/18
Fundamental Frequency	2402 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	2385.14	50.54	-10.71	39.83	74.00	-34.17	Peak	VERTICAL
2	2390.00	47.97	-10.68	37.29	74.00	-36.71	Peak	VERTICAL
3	2400.00	66.89	-10.66	56.23	74.00	-17.77	Peak	VERTICAL
4	2400.00	46.89	-10.66	36.23	54.00	-17.77	Average	VERTICAL
5	2401.98	95.15	-10.64	84.51	--	F	Peak	VERTICAL
1	2311.77	51.01	-10.97	40.04	74.00	-33.96	Peak	HORIZONTAL
2	2390.00	48.94	-10.68	38.26	74.00	-35.74	Peak	HORIZONTAL
3	2400.00	69.74	-10.66	59.08	74.00	-14.92	Peak	HORIZONTAL
4	2400.00	49.74	-10.66	39.08	54.00	-14.92	Average	HORIZONTAL
5	2401.88	98.69	-10.64	88.05	--	F	Peak	HORIZONTAL

Operation Mode	TX CH High	Test Date	2015/03/18
Fundamental Frequency	2480 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	2483.50	57.87	-10.34	47.53	74.00	-26.47	Peak	VERTICAL
1	2483.50	56.66	-10.34	46.32	74.00	-27.68	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 Emission: BDR Non-Hopping mode (worst case)

Operation Mode	TX CH Low	Test Date	2015/03/18
Fundamental Frequency	2402 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	2362.17	50.44	-10.79	39.65	74.00	-34.35	Peak	VERTICAL
2	2390.00	48.28	-10.68	37.60	74.00	-36.40	Peak	VERTICAL
3	2400.00	61.76	-10.66	51.10	74.00	-22.90	Peak	VERTICAL
4	2402.16	98.03	-10.64	87.39	--	F	Peak	VERTICAL
1	2381.70	50.98	-10.72	40.26	74.00	-33.74	Peak	HORIZONTAL
2	2390.00	48.14	-10.68	37.46	74.00	-36.54	Peak	HORIZONTAL
3	2400.00	63.32	-10.66	52.66	74.00	-21.34	Peak	HORIZONTAL
4	2402.07	100.70	-10.64	90.06	--	F	Peak	HORIZONTAL

Operation Mode	TX CH High	Test Date	2015/03/18
Fundamental Frequency	2480 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	2483.50	55.65	-10.34	45.31	74.00	-28.69	Peak	VERTICAL
1	2483.50	57.10	-10.34	46.76	74.00	-27.24	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.

8. SPURIOUS EMISSION TEST

8.1. Standard Applicable:

According to §15.247(d), all other emissions outside these bands shall not exceed the general radiated emission limits specified in §15.209(a). And according to §15.33(a)(1), for an intentional radiator operates below 10GHz, the frequency range of measurements: to the tenth harmonic of the highest fundamental frequency or to 40GHz, whichever is lower.

According to RSS-Gen §8.9 and RSS-210 issue 8, §A8.5, In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the radio frequency power that is produced 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. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under section A8.4(4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

8.2. Measurement Equipment Used:

8.2.1. Conducted Emission at antenna port:

Refer to section 6.2 for details.

8.2.2. Radiated emission:

Refer to section 7.2 for details.

8.3. Test SET-UP:

8.3.1. Conducted Emission at antenna port:

Refer to section 6.3 for details.

8.3.2. Radiated emission:

Refer to section 7.3 for details.

8.4. Measurement Procedure:

1. The EUT was placed on a turn table which is 0.8m/1.5m above ground plane.
2. The turn table shall rotate 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions.
4. When measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made "while keeping the antenna in the 'cone of radiation' from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response." is still within the 3dB illumination BW of the measurement antenna.
5. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
6. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
7. Repeat above procedures until all frequency measured were complete.

8.5. 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	

8.6. Measurement Result:

Note: Refer to next page spectrum analyzer data chart and tabular data sheets.

Radiated Spurious Emission Measurement Result: (below 1GHz) (Worst case: BDR Mode)

Operation Mode	TX CH Low	Test Date	2015/03/18
Fundamental Frequency	2402MHz	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	35.82	46.44	-13.00	33.44	40.00	-6.56	Peak	VERTICAL
2	258.92	41.81	-12.66	29.15	46.00	-16.85	Peak	VERTICAL
3	299.66	44.40	-11.11	33.29	46.00	-12.71	Peak	VERTICAL
4	386.96	40.86	-9.42	31.44	46.00	-14.56	Peak	VERTICAL
5	453.89	36.79	-7.75	29.04	46.00	-16.96	Peak	VERTICAL
6	797.27	27.01	-2.24	24.77	46.00	-21.23	Peak	VERTICAL
1	35.82	46.61	-13.00	33.61	40.00	-6.39	Peak	HORIZONTAL
2	180.35	38.63	-13.58	25.05	43.50	-18.45	Peak	HORIZONTAL
3	258.92	40.90	-12.66	28.24	46.00	-17.76	Peak	HORIZONTAL
4	388.90	37.33	-9.38	27.95	46.00	-18.05	Peak	HORIZONTAL
5	453.89	36.24	-7.75	28.49	46.00	-17.51	Peak	HORIZONTAL
6	978.66	28.45	0.73	29.18	54.00	-24.82	Peak	HORIZONTAL

Remark:

1 No further spurious emissions detected from the lowest internal frequency and 30MHz.

2 Measuring frequencies from the lowest internal frequency to the 1GHz.

3 Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak / QP detector mode.

4 Measurement result 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 The IF bandwidth of SPA between 30MHz to 1GHz was 100KHz, VBW=300KHz.

Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode	TX CH Mid	Test Date	2015/03/18
Fundamental Frequency	2441MHz	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	48.43	46.90	-12.04	34.86	40.00	-5.14	Peak	VERTICAL
2	258.92	43.15	-12.66	30.49	46.00	-15.51	Peak	VERTICAL
3	299.66	44.20	-11.11	33.09	46.00	-12.91	Peak	VERTICAL
4	386.96	40.75	-9.42	31.33	46.00	-14.67	Peak	VERTICAL
5	450.98	37.48	-7.76	29.72	46.00	-16.28	Peak	VERTICAL
6	798.24	27.75	-2.22	25.53	46.00	-20.47	Peak	VERTICAL
1	35.82	46.99	-13.00	33.99	40.00	-6.01	Peak	HORIZONTAL
2	258.92	40.28	-12.66	27.62	46.00	-18.38	Peak	HORIZONTAL
3	299.66	36.00	-11.11	24.89	46.00	-21.11	Peak	HORIZONTAL
4	388.90	37.91	-9.38	28.53	46.00	-17.47	Peak	HORIZONTAL
5	453.89	36.65	-7.75	28.90	46.00	-17.10	Peak	HORIZONTAL
6	954.41	28.70	0.42	29.12	46.00	-16.88	Peak	HORIZONTAL

Remark:

1 No further spurious emissions detected from the lowest internal frequency and 30MHz.

2 Measuring frequencies from the lowest internal frequency to the 1GHz.

3 Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak / QP detector mode.

4 Measurement result 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 The IF bandwidth of SPA between 30MHz to 1GHz was 100KHz, VBW=300KHz.

Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode	TX CH High	Test Date	2015/03/18
Fundamental Frequency	2480MHz	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	48.43	46.36	-12.04	34.32	40.00	-5.68	Peak	VERTICAL
2	257.95	41.87	-12.68	29.19	46.00	-16.81	Peak	VERTICAL
3	299.66	44.27	-11.11	33.16	46.00	-12.84	Peak	VERTICAL
4	388.90	42.08	-9.38	32.70	46.00	-13.30	Peak	VERTICAL
5	452.92	36.02	-7.76	28.26	46.00	-17.74	Peak	VERTICAL
6	797.27	28.06	-2.24	25.82	46.00	-20.18	Peak	VERTICAL
1	48.43	47.21	-12.04	35.17	40.00	-4.83	Peak	HORIZONTAL
2	215.27	39.02	-14.82	24.20	43.50	-19.30	Peak	HORIZONTAL
3	257.95	40.07	-12.68	27.39	46.00	-18.61	Peak	HORIZONTAL
4	386.96	37.75	-9.42	28.33	46.00	-17.67	Peak	HORIZONTAL
5	453.89	35.62	-7.75	27.87	46.00	-18.13	Peak	HORIZONTAL
6	955.38	28.04	0.42	28.46	46.00	-17.54	Peak	HORIZONTAL

Remark:

1 No further spurious emissions detected from the lowest internal frequency and 30MHz.

2 Measuring frequencies from the lowest internal frequency to the 1GHz.

3 Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak / QP detector mode.

4 Measurement result 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 The IF bandwidth of SPA between 30MHz to 1GHz was 100KHz, VBW=300KHz.

Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode	TX CH Low	Test Date	2015/03/18
Fundamental Frequency	2402 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	4804.00	46.31	-3.19	43.12	74.00	-30.88	Peak	VERTICAL
2	7206.00	36.52	4.17	40.69	74.00	-33.31	Peak	VERTICAL
1	4804.00	49.39	-3.19	46.20	74.00	-27.80	Peak	HORIZONTAL
2	7206.00	37.18	4.17	41.35	74.00	-32.65	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 Mid	Test Date	2015/03/18
Fundamental Frequency	2441 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	4882.00	46.86	-3.02	43.84	74.00	-30.16	Peak	VERTICAL
2	7323.00	38.18	4.48	42.66	74.00	-31.34	Peak	VERTICAL
1	4882.00	48.90	-3.02	45.88	74.00	-28.12	Peak	HORIZONTAL
2	7323.00	39.41	4.48	43.89	74.00	-30.11	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 High	Test Date	2015/03/18
Fundamental Frequency	2480 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	4960.00	49.25	-2.84	46.41	74.00	-27.59	Peak	VERTICAL
2	7440.00	38.53	4.80	43.33	74.00	-30.67	Peak	VERTICAL
1	4960.00	50.33	-2.84	47.49	74.00	-26.51	Peak	HORIZONTAL
2	7440.00	39.25	4.80	44.05	74.00	-29.95	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.

9. FREQUENCY SEPARATION

9.1. Standard Applicable:

According to §15.247(a)(1), Frequency hopping systems shall have hopping channel carrier frequencies separated by minimum of 25KHz or the 20dB bandwidth of the hopping channel, whichever is greater.

According to RSS 210 issue 8, A8.1(b), frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater.

9.2. Measurement Equipment Used:

Refer to section 6.2 for details.

9.3. Test Set-up:

Refer to section 6.3 for details.

9.4. Measurement Procedure:

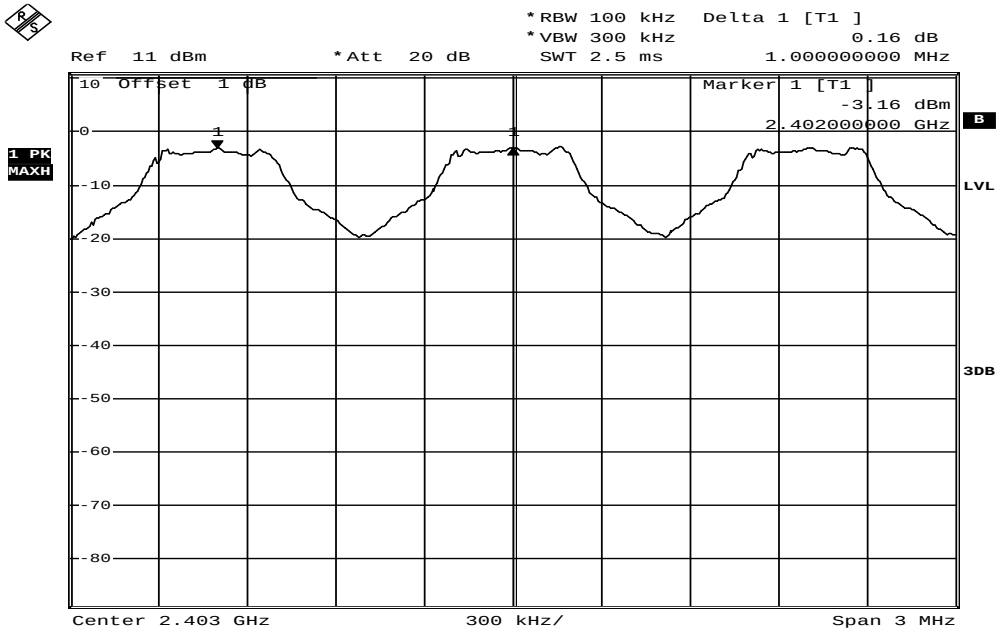
1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set center frequency of spectrum analyzer = middle of hopping channel .
4. Set the spectrum analyzer as RBW,VBW=100KHz, Adjust Span to 3.0 MHz, Sweep = auto.
5. Max hold. Mark 3 Peaks of hopping channel and record the 3 peaks frequency.

9.5. Measurement Result:

Channel separation (MHz)	Limit	Result
1	>=25KHz or 2/3 times 20dB bandwidth	PASS

Note: Refer to next page for plots.

Frequency Separation Test Data



Date: 19.MAR.2015 13:44:56

10. NUMBER OF HOPPING FREQUENCY

10.1. Standard Applicable:

According to §15.247(a)(1)(iii), Frequency hopping systems operating in the 2400MHz-2483.5 MHz bands shall use at least 15 hopping frequencies.

According to RSS-210 issue 8,§A8.1(d), For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 hopping channels, the maximum conducted output power shall not exceed 1 W. For all other frequency hopping systems, the maximum peak conducted output power shall not exceed 0.125 W.

10.2. Measurement Equipment Used:

Refer to section 6.2 for details.

10.3. Test Set-up:

Refer to section 6.3 for details.

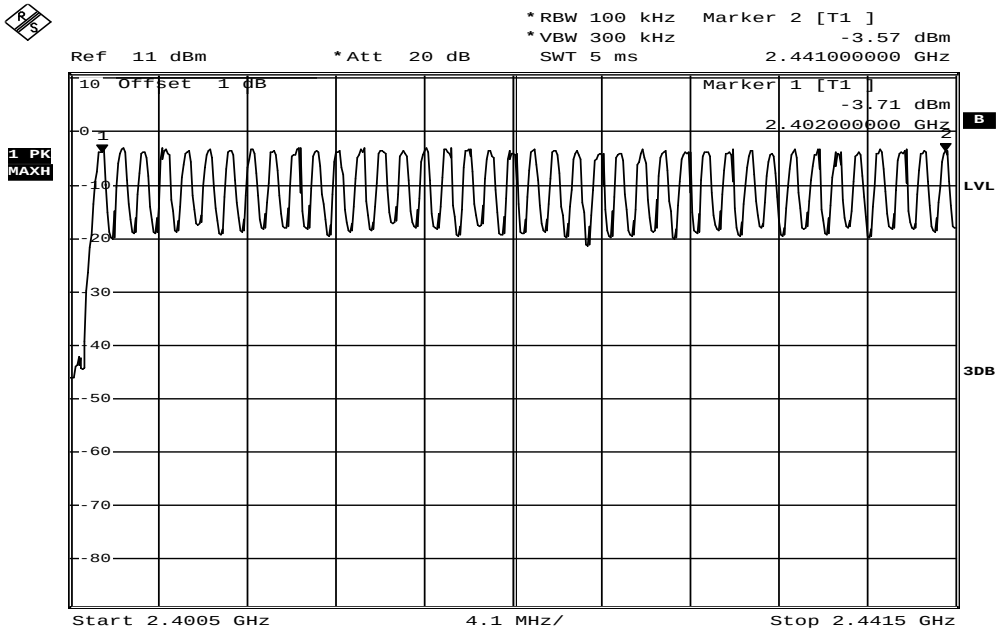
10.4. Measurement Procedure:

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 spectrum analyzer Start=2400MHz, Stop = 2441MHz and Start=2441MHz, Stop = 2483.5MHz, Sweep = auto.
4. Set the spectrum analyzer as RBW=300KHz, VBW=1MHz
5. Max hold, view and count how many channel in the band.

10.5. Measurement Result:

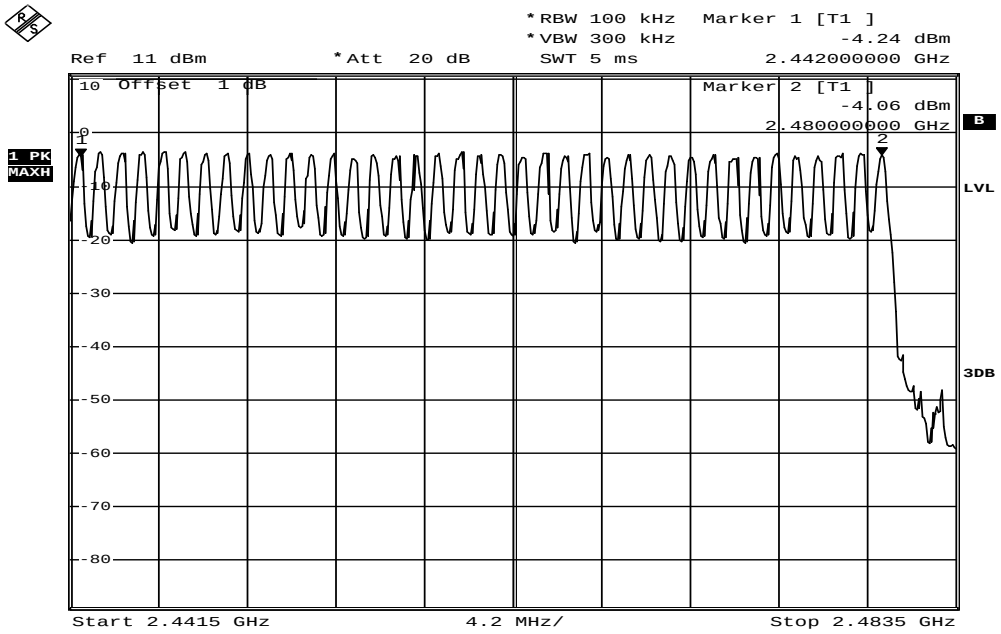
Note: Refer to next page for plots.

Channel Number
2.4 GHz – 2.441GHz



Date: 19.MAR.2015 13:20:41

2.441 GHz – 2.4835GHz



Date: 19.MAR.2015 13:22:22

11. TIME OF OCCUPANCY (DWELL TIME)

11.1. Standard Applicable:

According to §15.247(a)(1)(iii), Frequency hopping systems operating in the 2400MHz-2483.5 MHz. The average time of occupancy on any frequency shall not greater than 0.4 s within period of 0.4 seconds multiplied by the number of hopping channel employed.

According to RSS-210 issue 8,§A8.1(d), Frequency hopping systems operating in the 2400-2483.5 MHz band shall use at least 15 hopping channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Transmissions on particular hopping frequencies may be avoided or suppressed provided that a minimum of 15 hopping channels are used.

11.2. Measurement Equipment Used:

Refer to section 6.2 for details.

11.3. Test Set-up:

Refer to section 6.3 for details.

11.4. 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 center frequency of spectrum analyzer = operating frequency.
4. Set the spectrum analyzer as RBW / VBW =1MHz, Span = 0Hz , Adjust Sweep = 2.5ms.
5. Repeat above procedures until all frequency measured were complete.

11.5. Measurement Result:

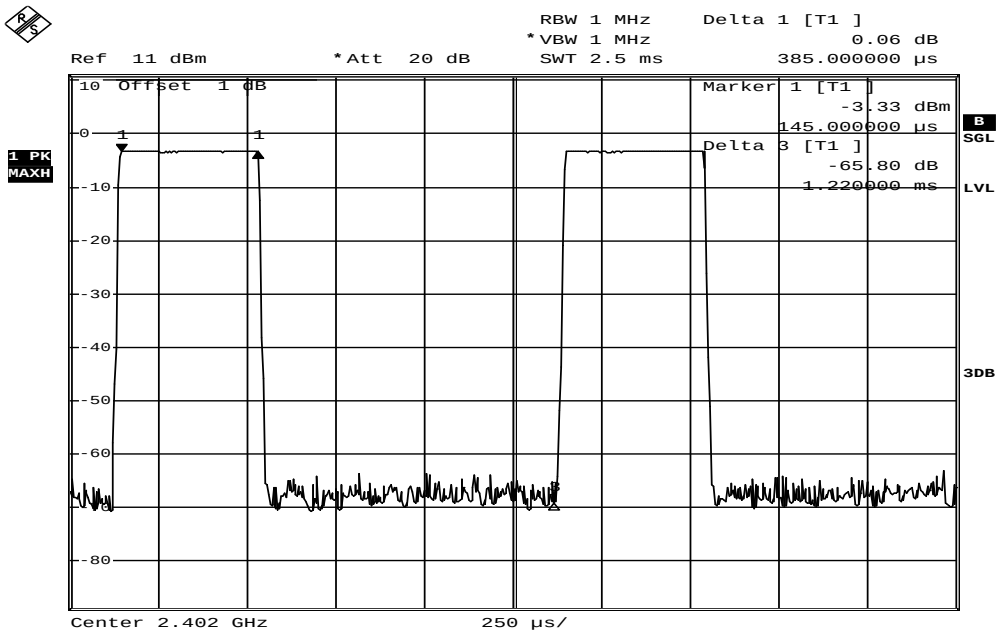
A period time = 0.4 (ms) * 79 = 31.6 (s)

CH Low	DH1 time slot	=	0.385 (ms)	*	(1600/2/79)	* 31.6 =	123.20	(ms)
	DH3 time slot	=	1.654 (ms)	*	(1600/4/79)	* 31.6 =	264.64	(ms)
	DH5 time slot	=	2.891 (ms)	*	(1600/6/79)	* 31.6 =	308.37	(ms)
CH Mid	DH1 time slot	=	0.385 (ms)	*	(1600/2/79)	* 31.6 =	123.20	(ms)
	DH3 time slot	=	1.651 (ms)	*	(1600/4/79)	* 31.6 =	264.16	(ms)
	DH5 time slot	=	2.911 (ms)	*	(1600/6/79)	* 31.6 =	310.51	(ms)
CH High	DH1 time slot	=	0.390 (ms)	*	(1600/2/79)	* 31.6 =	124.80	(ms)
	DH3 time slot	=	1.651 (ms)	*	(1600/4/79)	* 31.6 =	264.16	(ms)
	DH5 time slot	=	2.911 (ms)	*	(1600/6/79)	* 31.6 =	310.51	(ms)

Note: Refer to next page for plots.

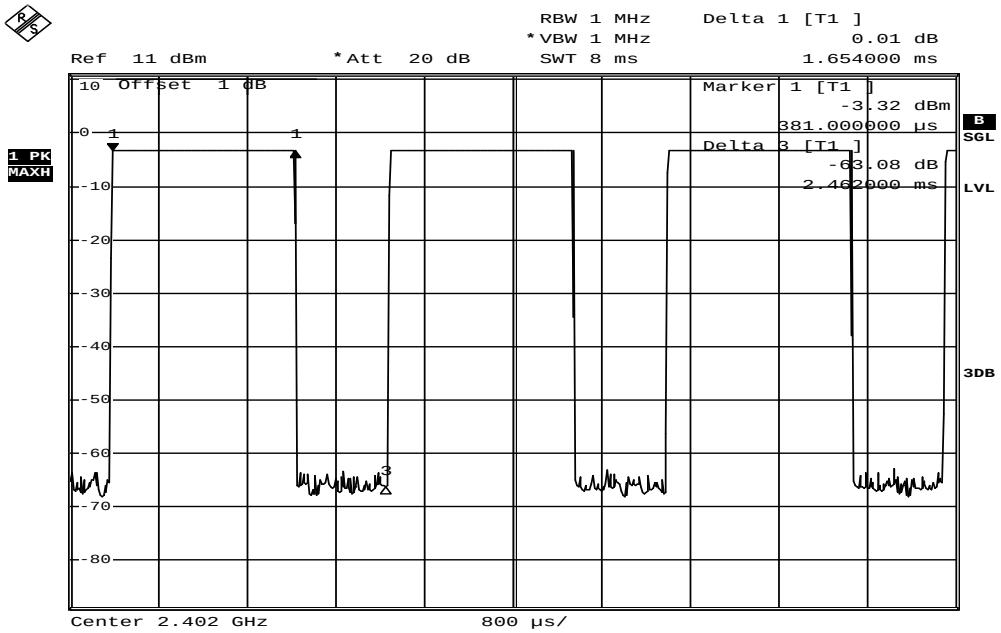
Low Channel

DH1



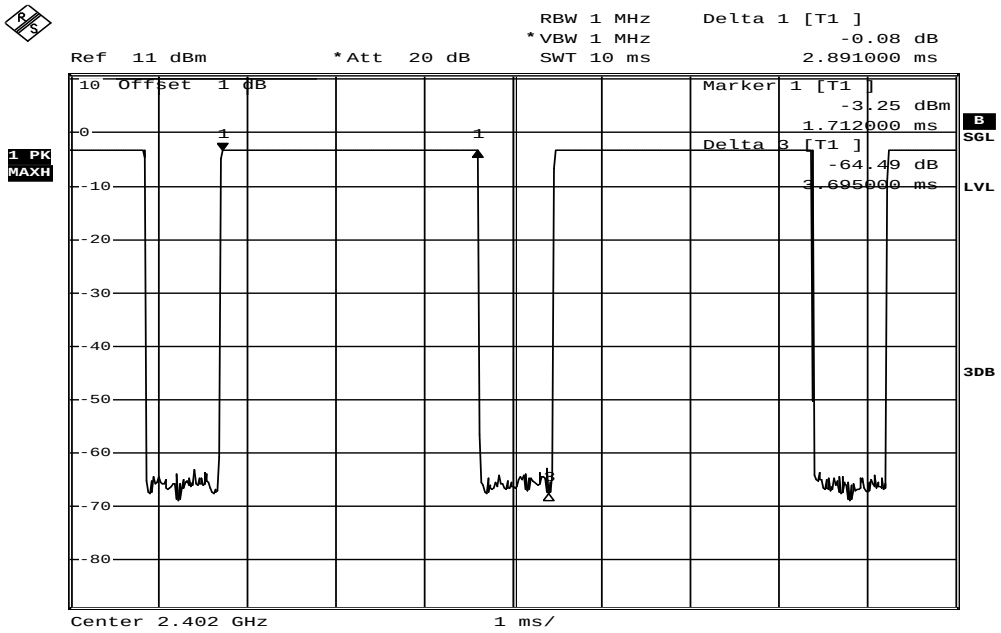
Date: 19.MAR.2015 13:24:30

DH3



Date: 19.MAR.2015 13:27:51

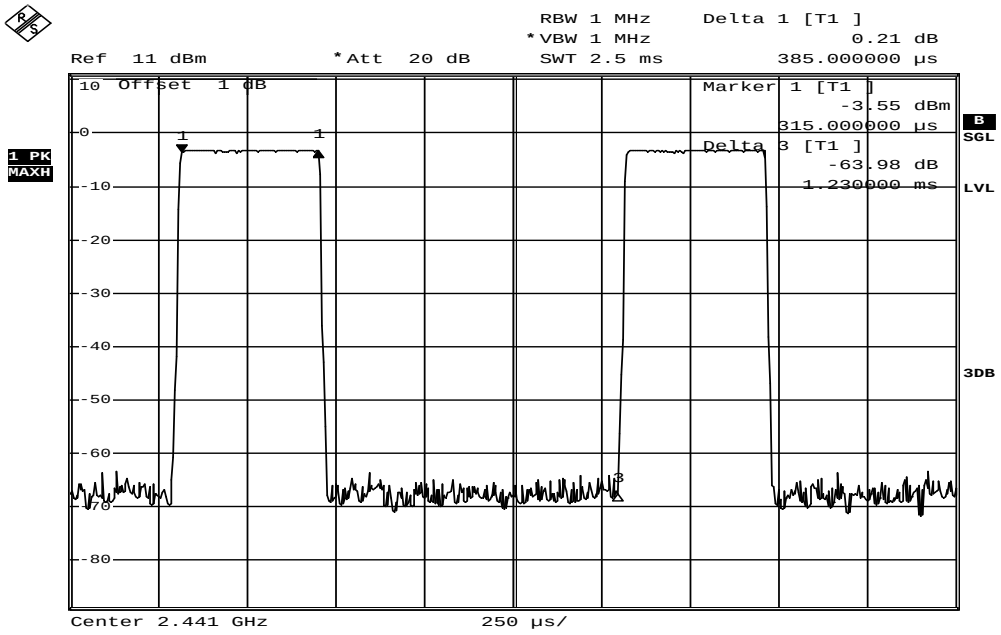
DH5



Date: 19.MAR.2015 13:30:10

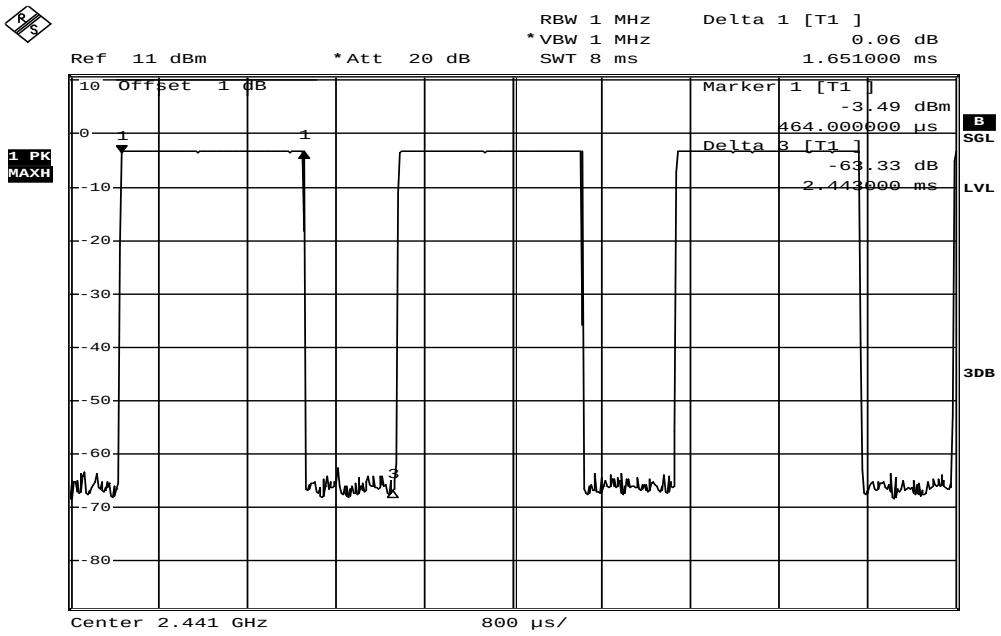
Mid Channel

DH1



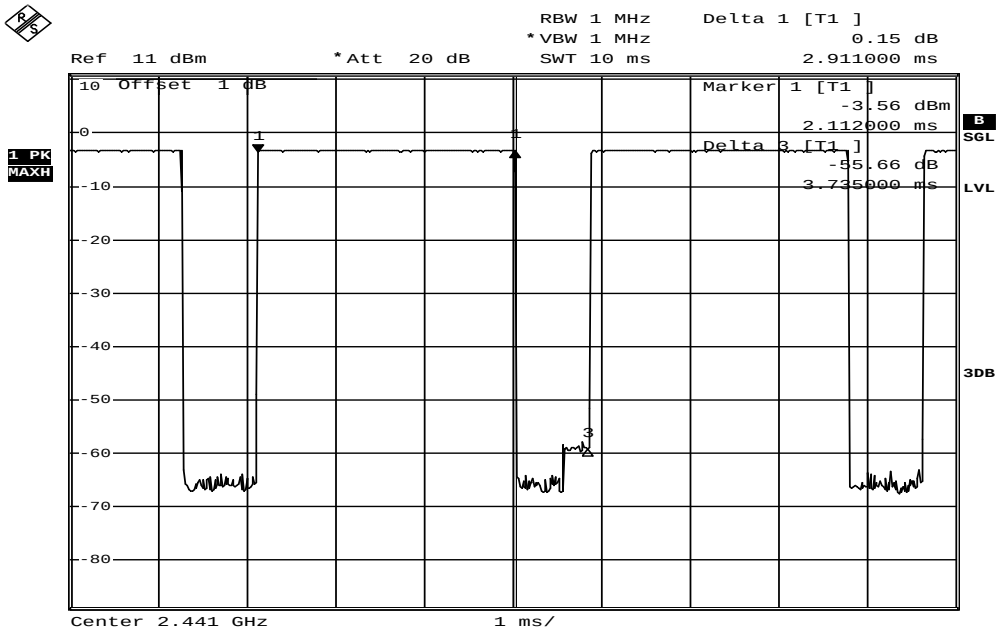
Date: 19.MAR.2015 13:25:02

DH3



Date: 19.MAR.2015 13:28:22

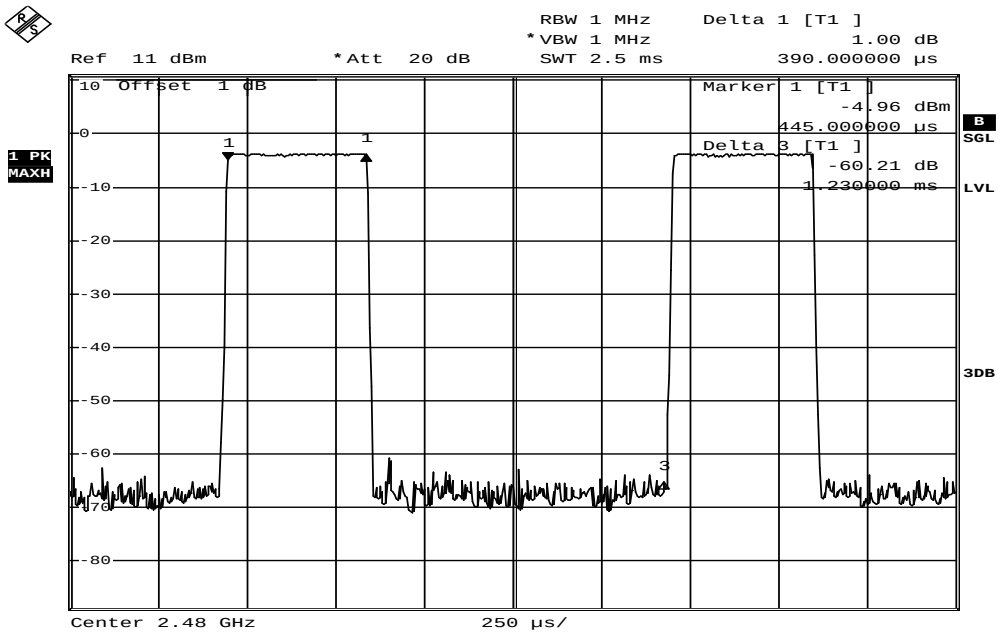
DH5



Date: 19.MAR.2015 13:30:47

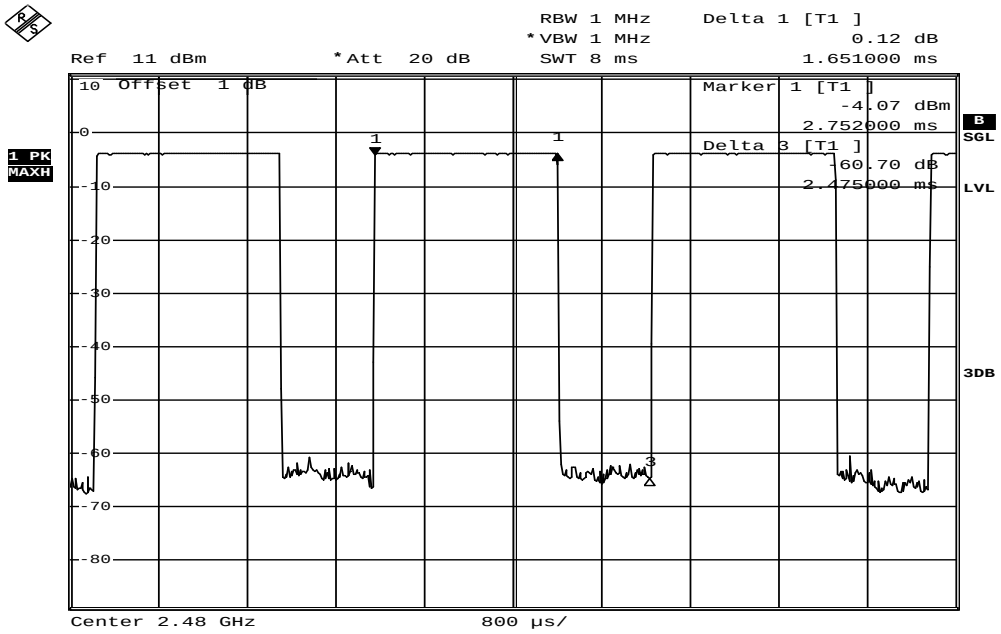
High Channel

DH1



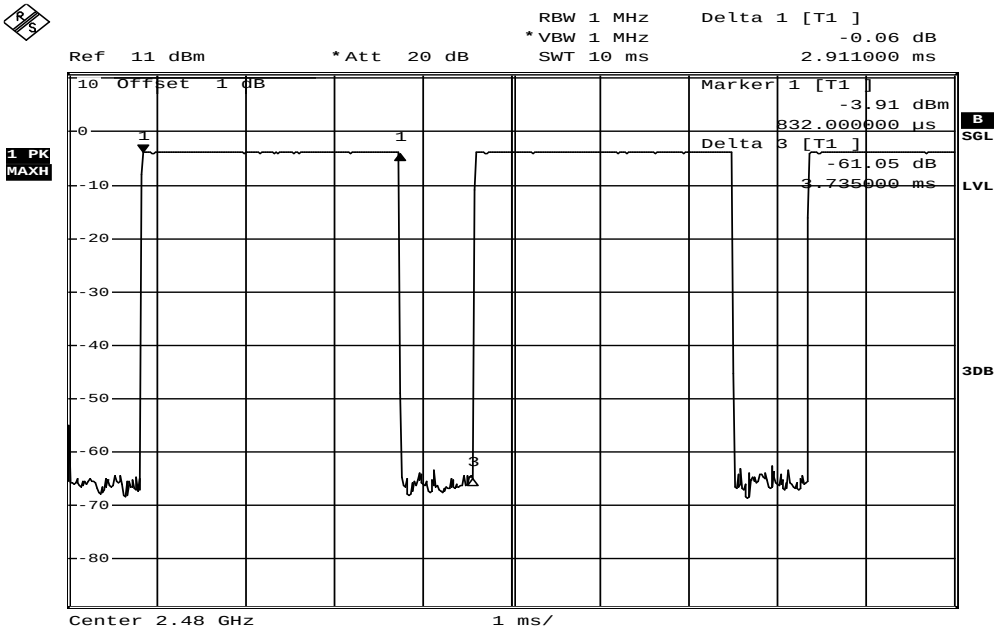
Date: 19.MAR.2015 13:25:45

DH3



Date: 19.MAR.2015 13:28:56

DH5



Date: 19.MAR.2015 13:31:23

12. 20dB Bandwidth & 99% Bandwidth

12.1. Standard Applicable:

According to §15.247(a)(1),and RSS210 A8.1(b) for frequency hopping systems operating in the 2400MHz-2483.5 MHz no limit for 20dB bandwidth.

12.2. Measurement Equipment Used:

Refer to section 6.2 for details.

12.3. Test Set-up:

Refer to section 6.3 for details.

12.4. 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=10KHz (1 % of Bandwidth.), Span= 3MHz, Sweep=auto
4. Mark the peak frequency and –20dB (upper and lower) frequency.
5. Repeat above procedures until all frequency measured were complete.

12.5. Measurement Result:

BDR Mode

CH	20dB Bandwidth (MHz)	99% Bandwidth (MHz)
Lower	0.804	0.864
Mid	0.804	0.864
Higher	0.804	0.864

EDR 2M Mode

CH	20dB Bandwidth (MHz)	2/3* 20dB Bandwidth (MHz)	99% Bandwidth (MHz)
Lower	1.266	0.844	1.194
Mid	1.248	0.832	1.188
Higher	1.272	0.848	1.194

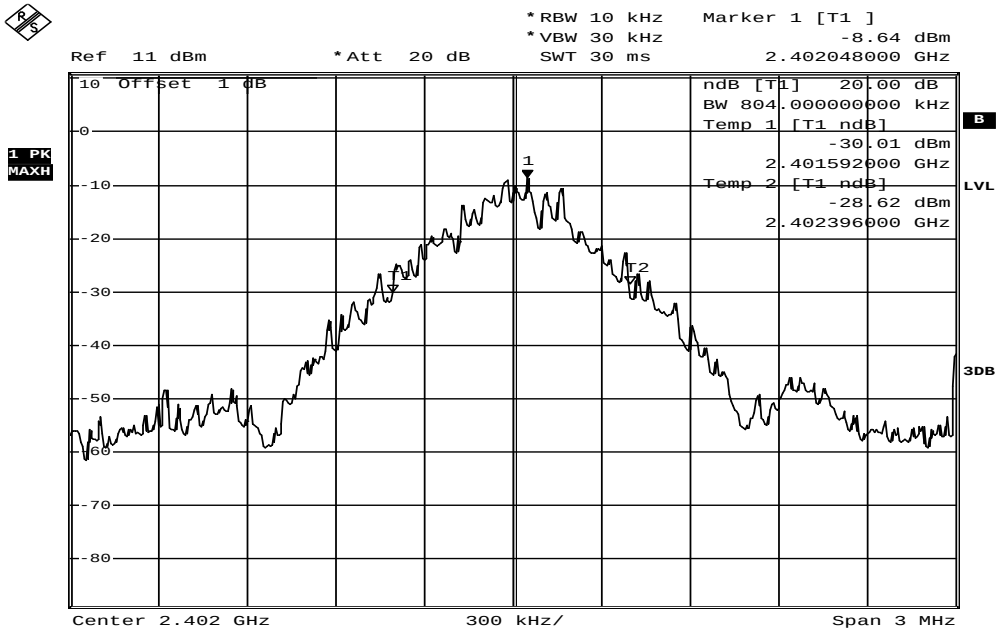
EDR 3M Mode

CH	20dB Bandwidth (MHz)	2/3* 20dB Bandwidth (MHz)	99% Bandwidth (MHz)
Lower	1.302	0.868	1.200
Mid	1.266	0.844	1.200
Higher	1.272	0.848	1.200

Note: Refer to next page for plots.

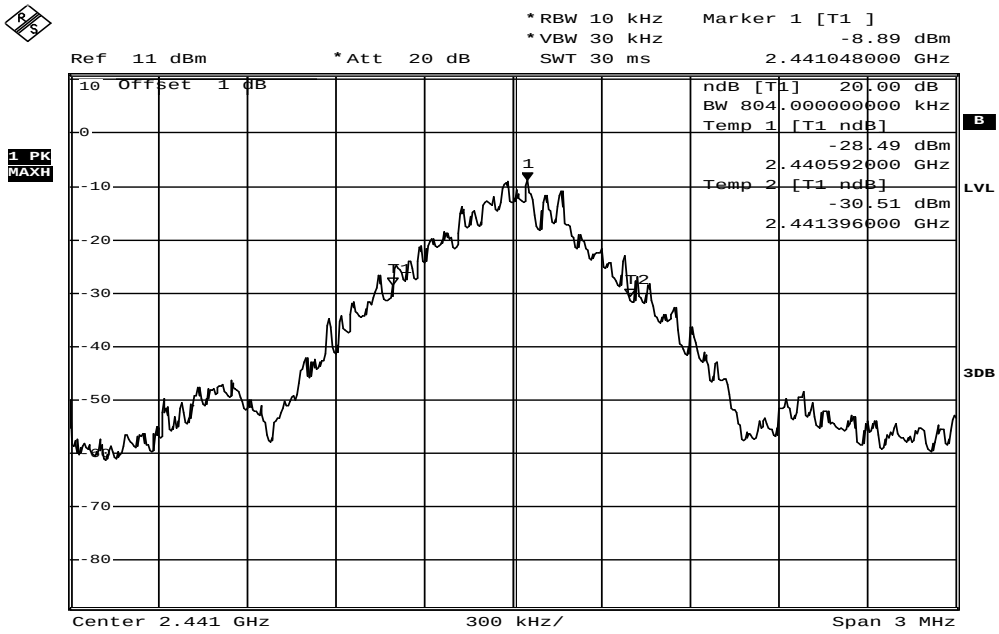
BDR Mode

20dB Bandwidth Test Data CH-Low



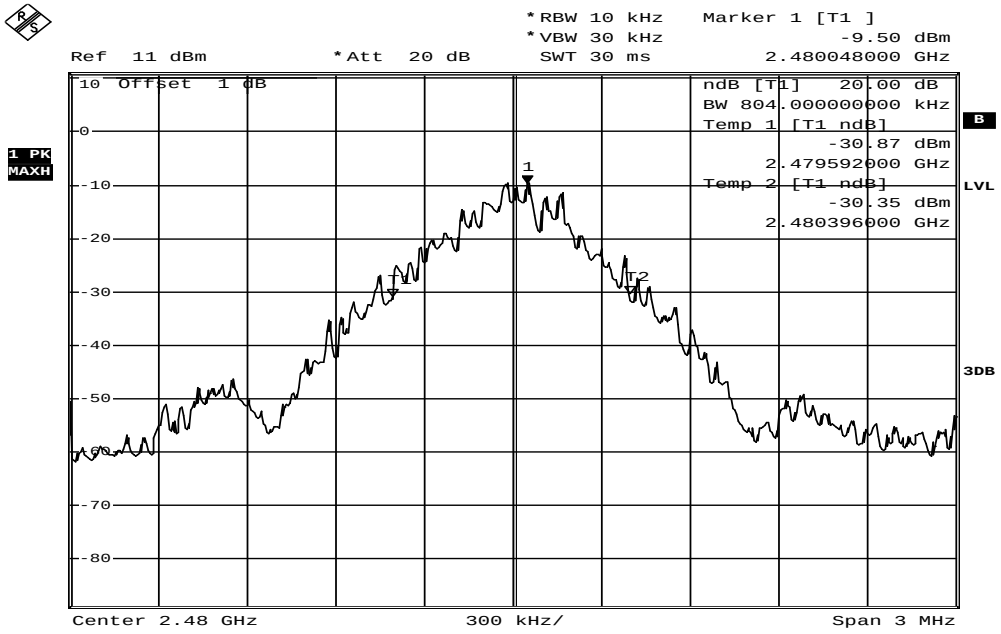
Date: 19.MAR.2015 13:59:38

20dB Bandwidth Test Data CH-Mid



Date: 19.MAR.2015 13:59:54

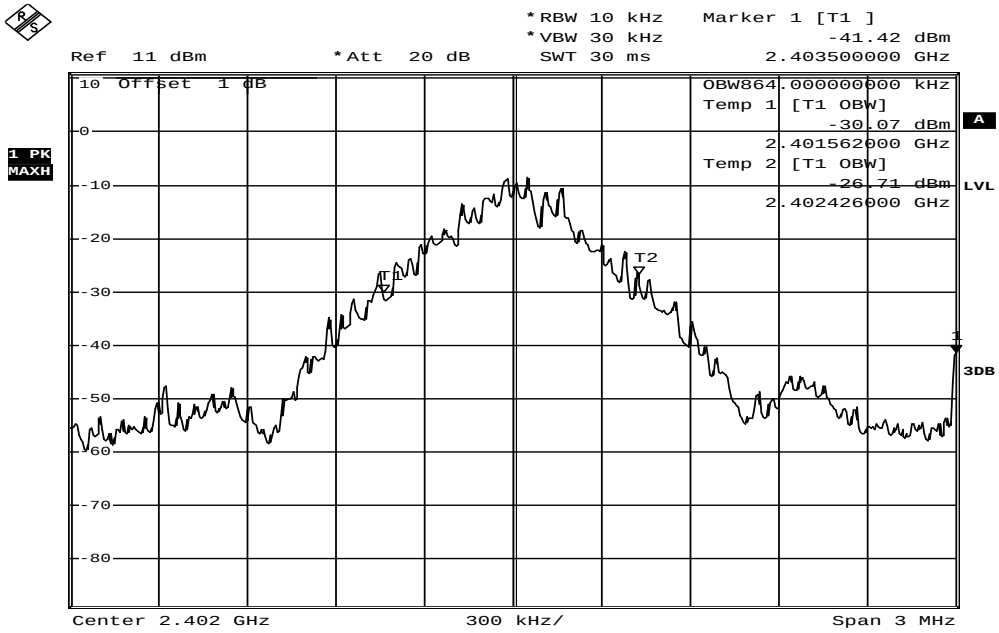
20dB Bandwidth Test Data CH-High



Date: 19.MAR.2015 14:00:10

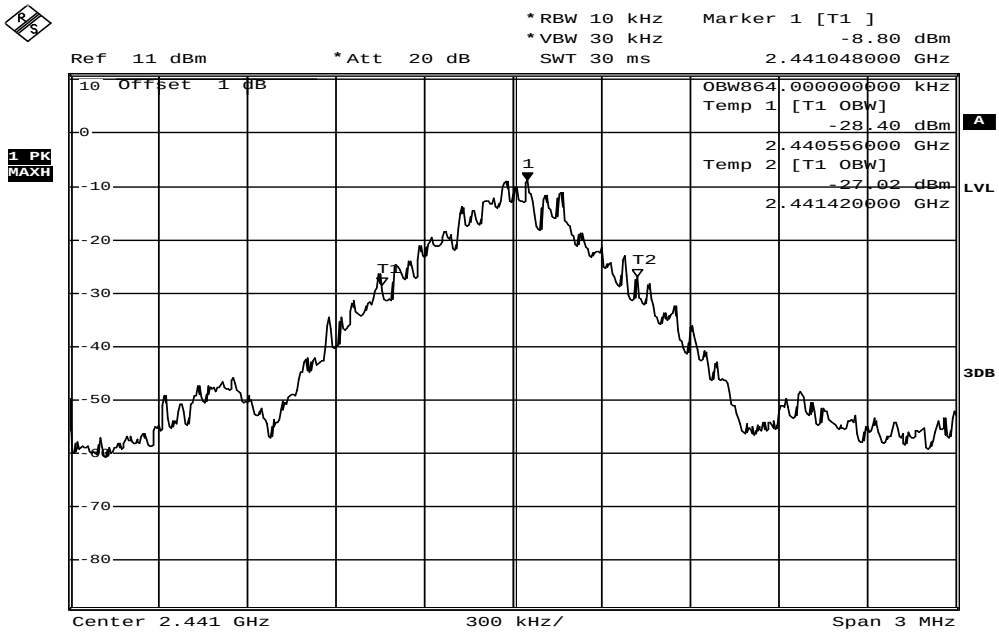
BDR Mode

99% Bandwidth Test Data CH-Low



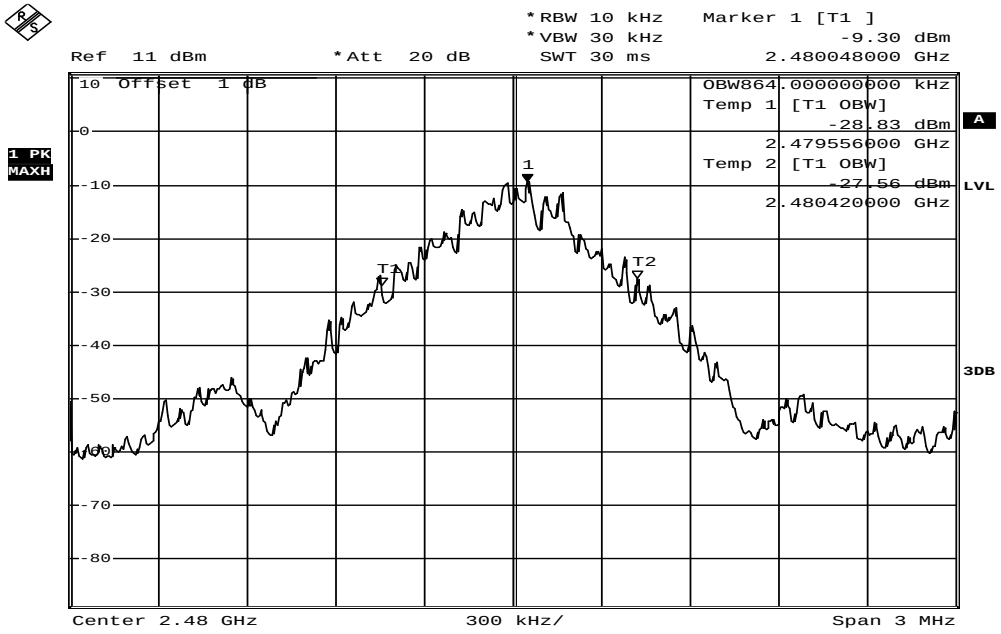
Date: 19.MAR.2015 13:51:45

99% Bandwidth Test Data CH-Mid



Date: 19.MAR.2015 13:53:20

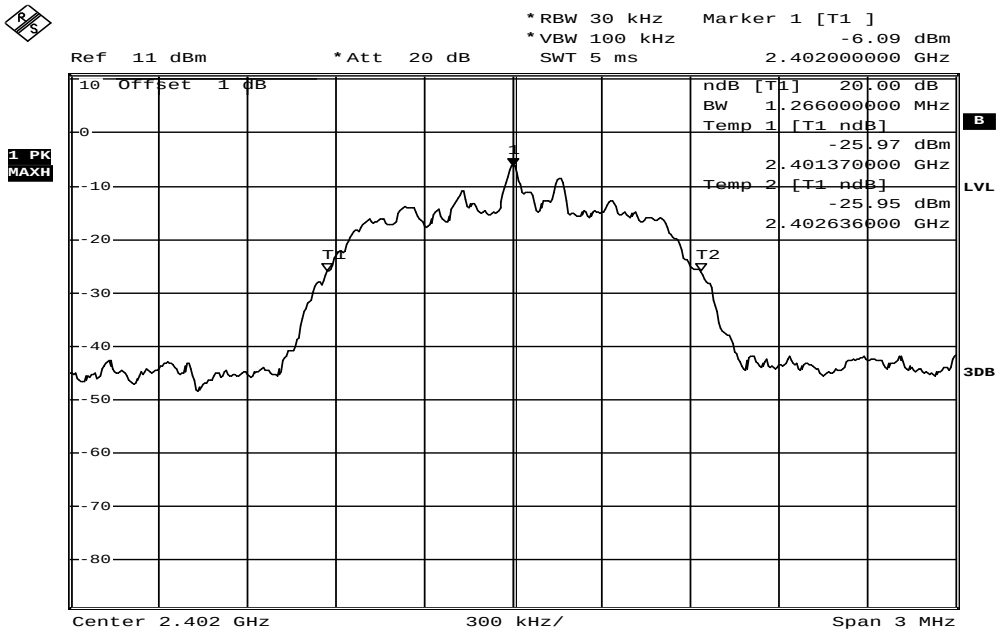
99% Bandwidth Test Data CH-High



Date: 19.MAR.2015 13:53:59

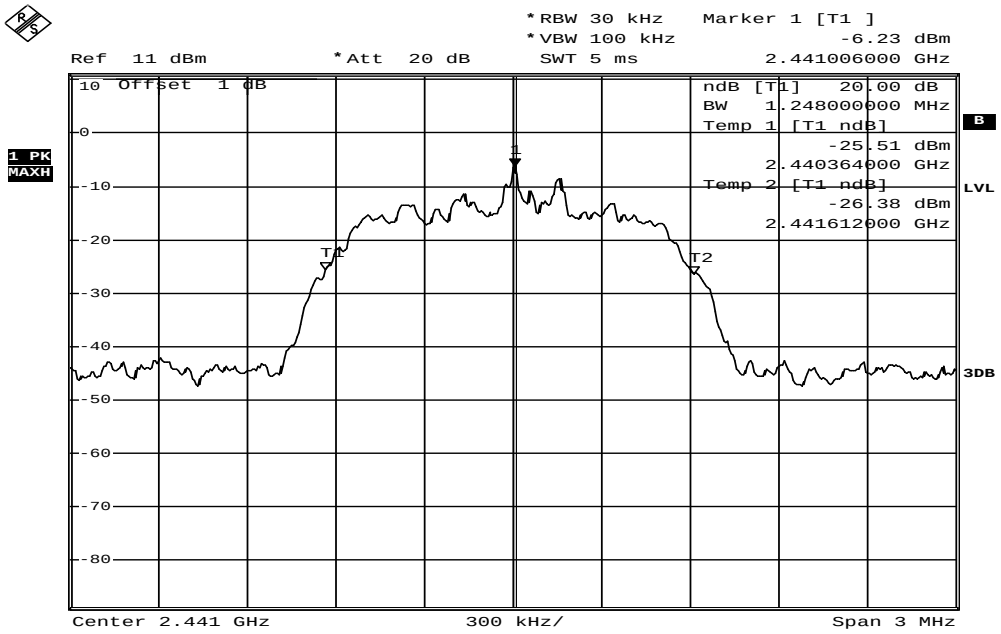
EDR 2M Mode

20dB Bandwidth Test Data CH-Low



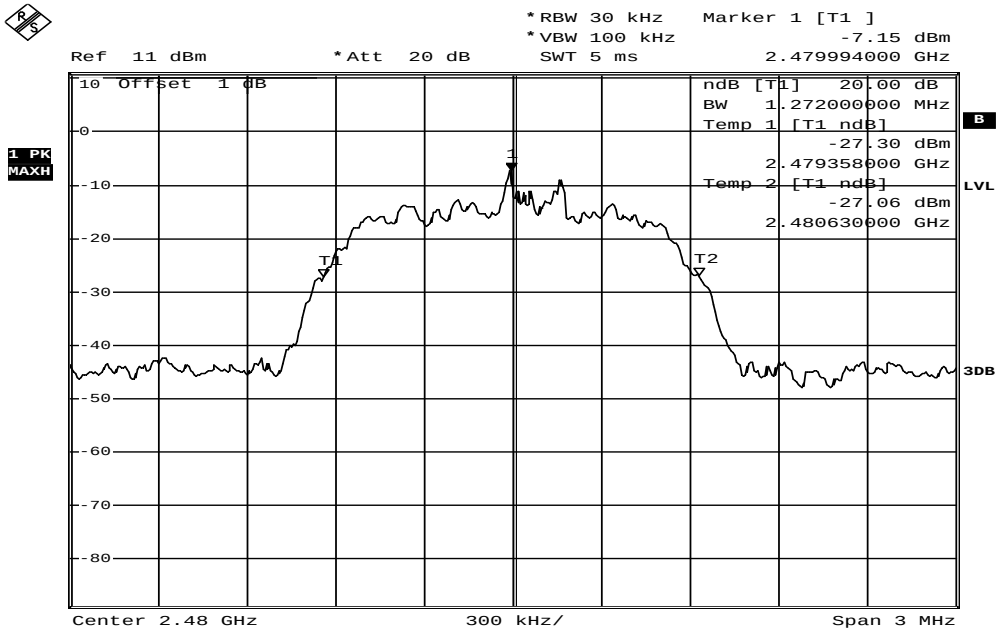
Date: 19.MAR.2015 13:56:34

20dB Bandwidth Test Data CH-Mid



Date: 19.MAR.2015 13:57:10

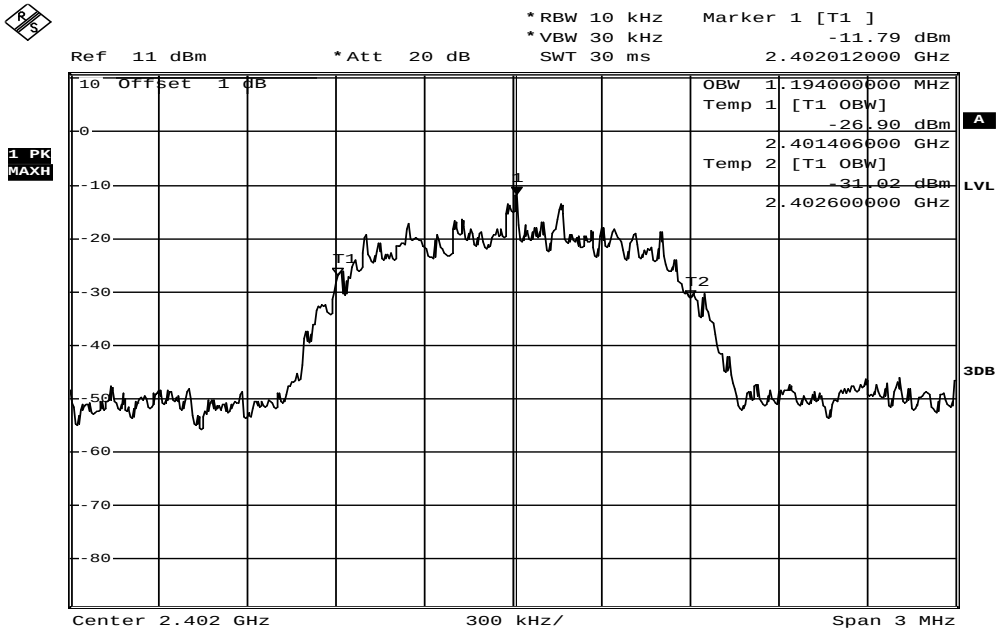
20dB Bandwidth Test Data CH-High



Date: 19.MAR.2015 13:57:53

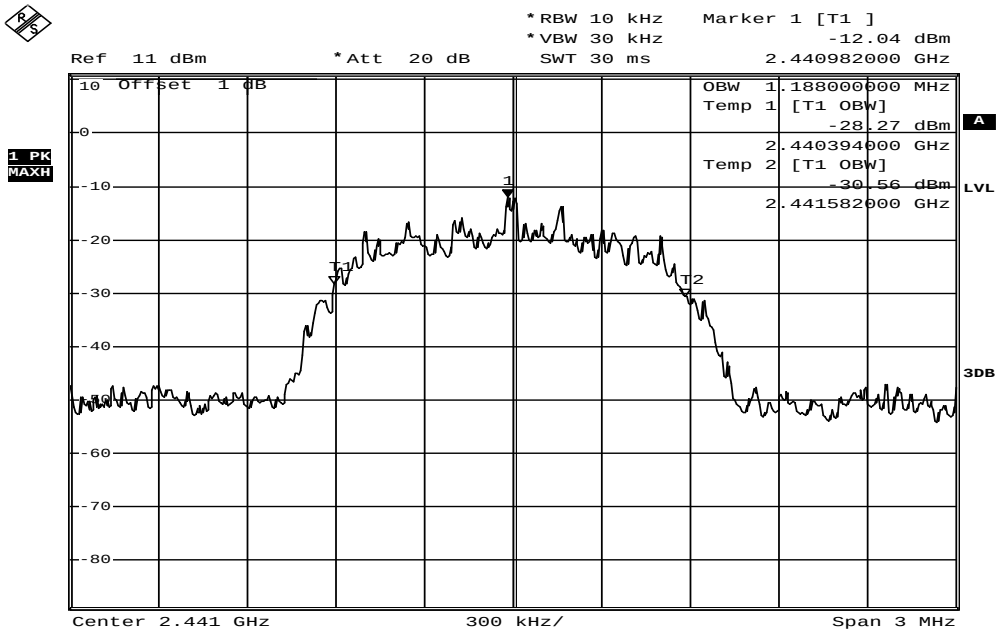
EDR 2M Mode

99% Bandwidth Test Data CH-Low



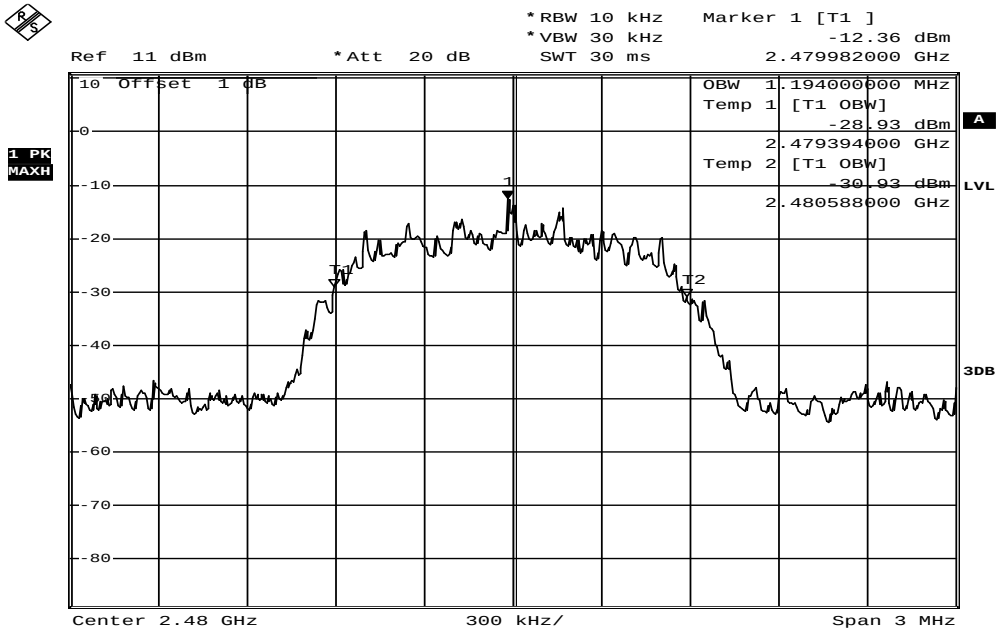
Date: 19.MAR.2015 13:56:47

99% Bandwidth Test Data CH-Mid



Date: 19.MAR.2015 13:57:24

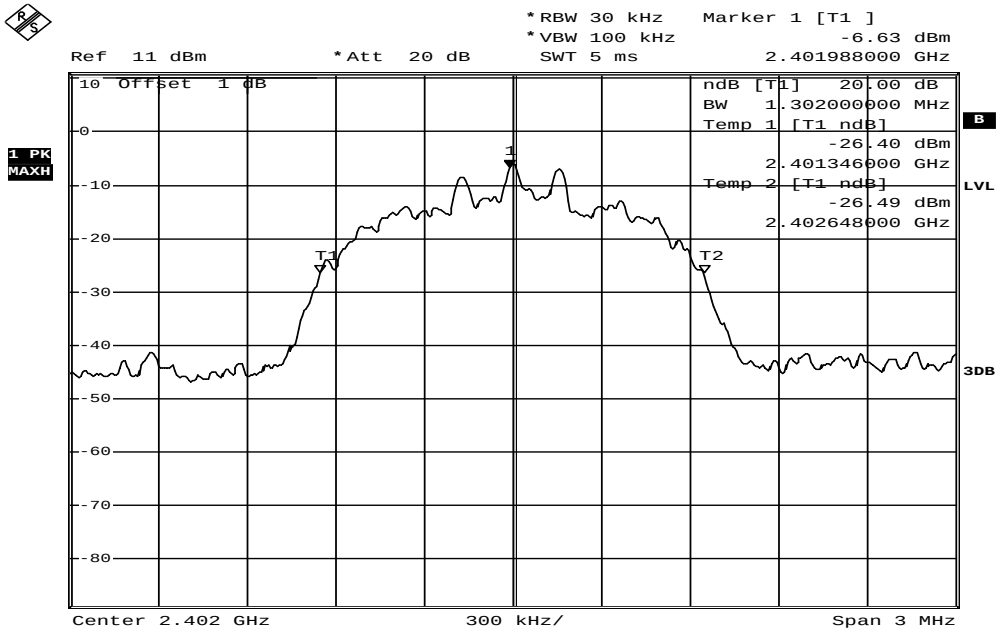
99% Bandwidth Test Data CH-High



Date: 19.MAR.2015 13:58:05

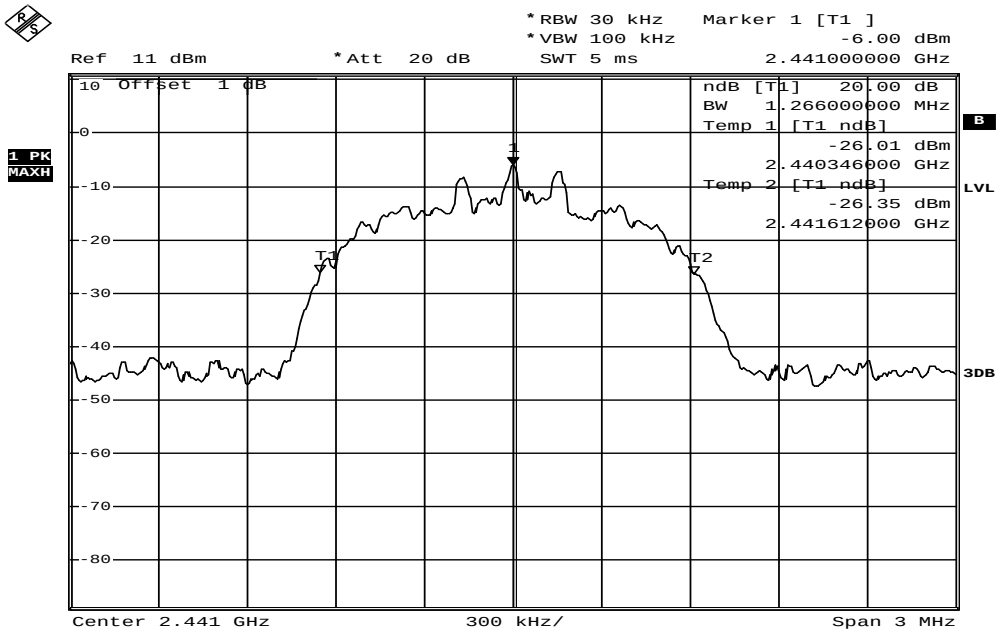
EDR 3M Mode

20dB Bandwidth Test Data CH-Low



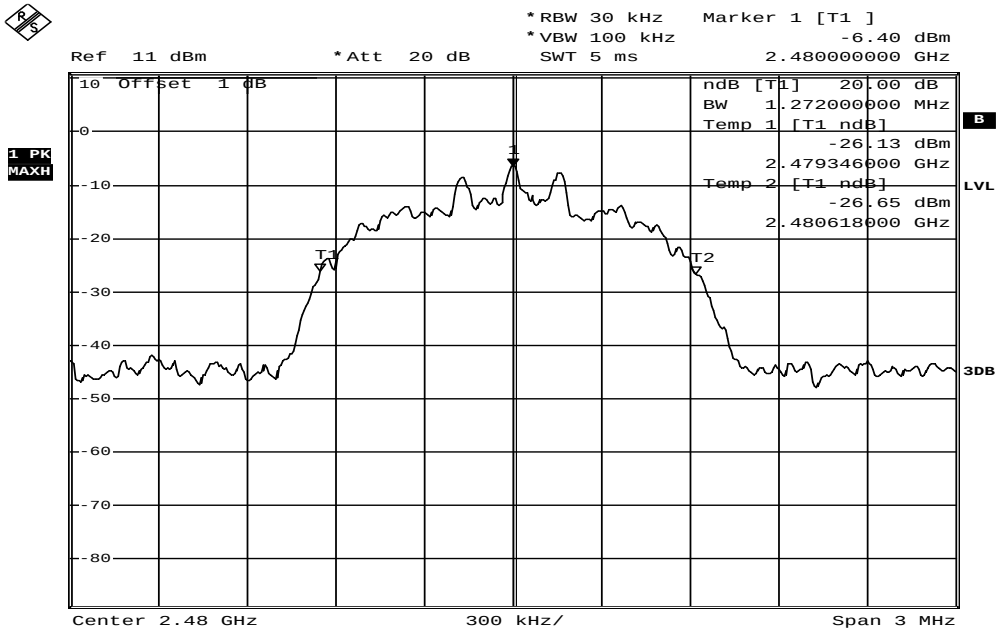
Date: 19.MAR.2015 14:04:38

20dB Bandwidth Test Data CH-Mid



Date: 19.MAR.2015 14:05:26

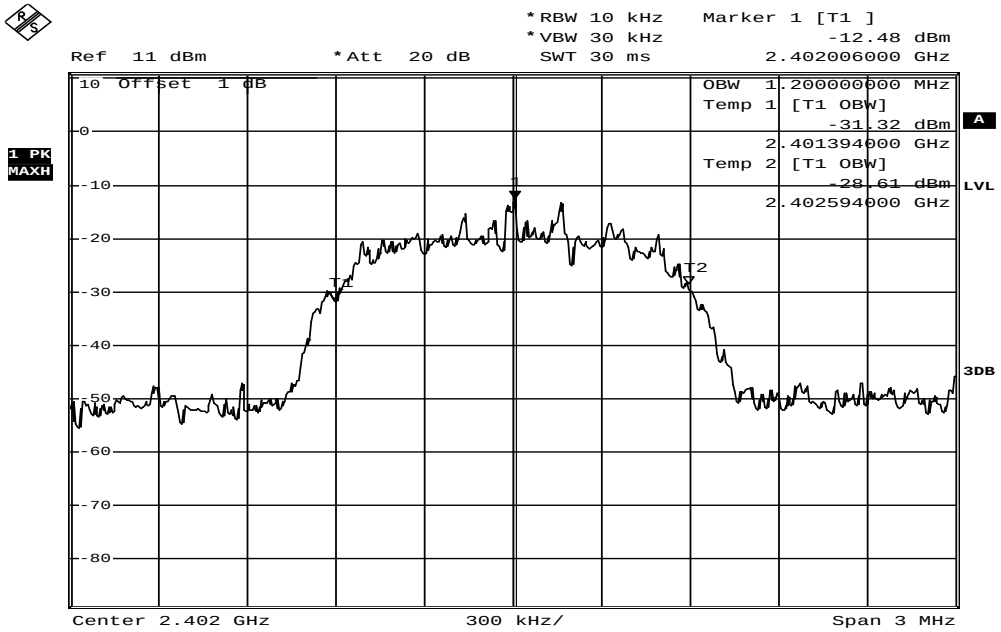
20dB Bandwidth Test Data CH-High



Date: 19.MAR.2015 14:06:43

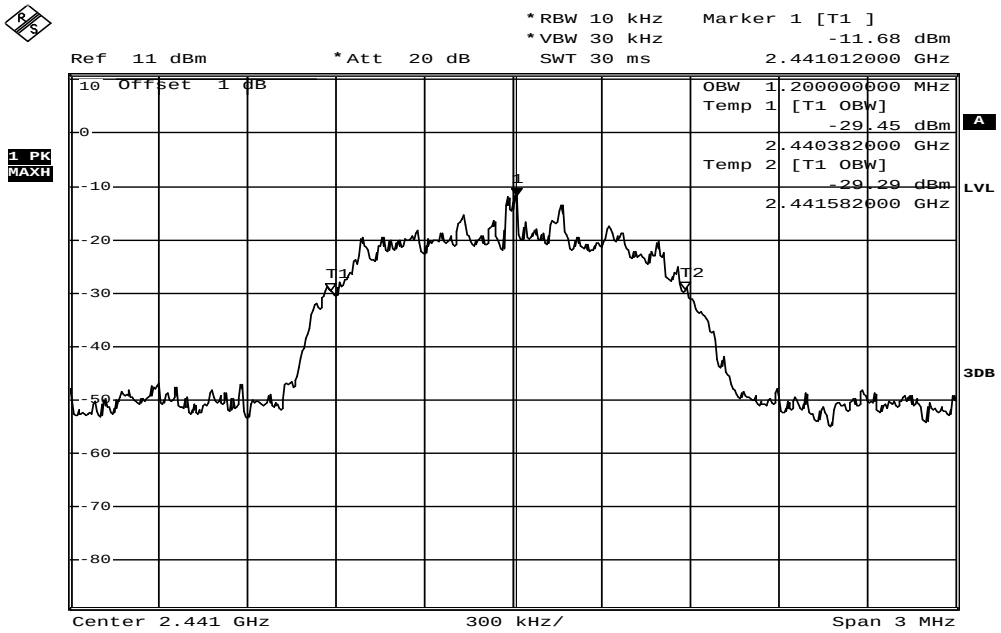
EDR 3M Mode

99% Bandwidth Test Data CH-Low



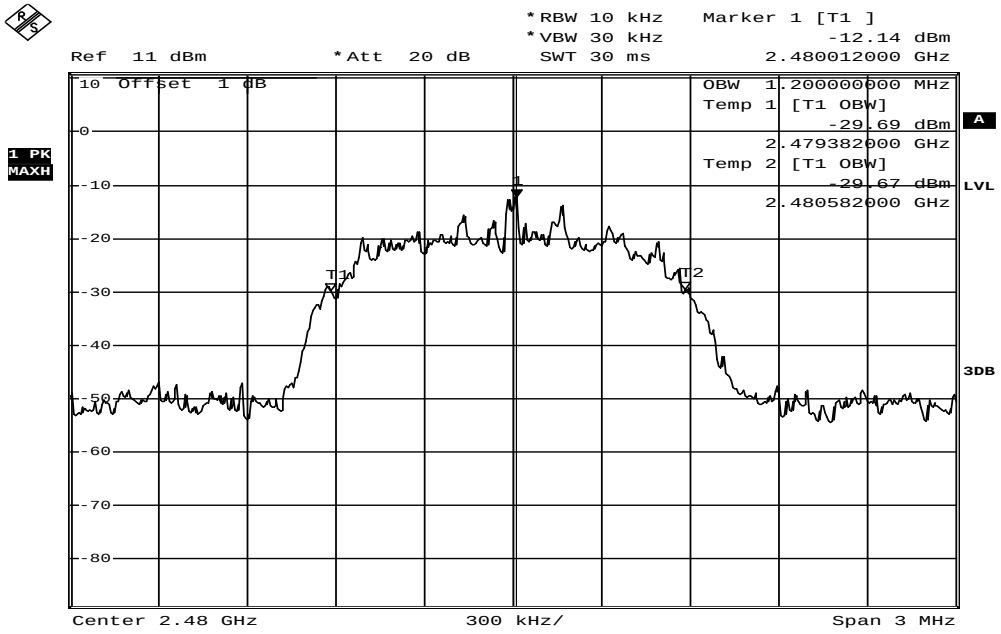
Date: 19.MAR.2015 14:04:54

99% Bandwidth Test Data CH-Mid



Date: 19.MAR.2015 14:05:48

99% Bandwidth Test Data CH-High



Date: 19.MAR.2015 14:07:01

13. ANTENNA REQUIREMENT

13.1. Standard Applicable:

According to §15.203, an intentional radiator shall be designed to ensure that no antenna other than furnished by the responsible party shall be used with the device.

And according to §15.247(c), if transmitting antennas of directional gain greater than 6dBi are used the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

According to RSS-GEN 8.3, the applicant for equipment certification, as per RSP-100, must provide a list of all antenna types that may be used with the licence-exempt transmitter, indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna.

Licence-exempt transmitters that have received equipment certification may operate with different types of antennas. However, it is not permissible to exceed the maximum equivalent isotropically radiated power (e.i.r.p.) limits specified in the applicable standard (RSS) for the licence-exempt apparatus.

Testing shall be performed using the highest gain antenna of each combination of licence-exempt transmitter and antenna type, with the transmitter output power set at the maximum level.9 When a measurement at the antenna connector is used to determine RF output power, the effective gain of the device's antenna shall be stated, based on a measurement or on data from the antenna manufacturer.

User manuals for transmitters equipped with detachable antennas shall also contain the following notice in a conspicuous location:

This radio transmitter (identify the device by certification number or model number if Category II) has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Immediately following the above notice, the manufacturer shall provide a list of all antenna types approved for use with the transmitter, indicating the maximum permissible antenna gain (in dBi).

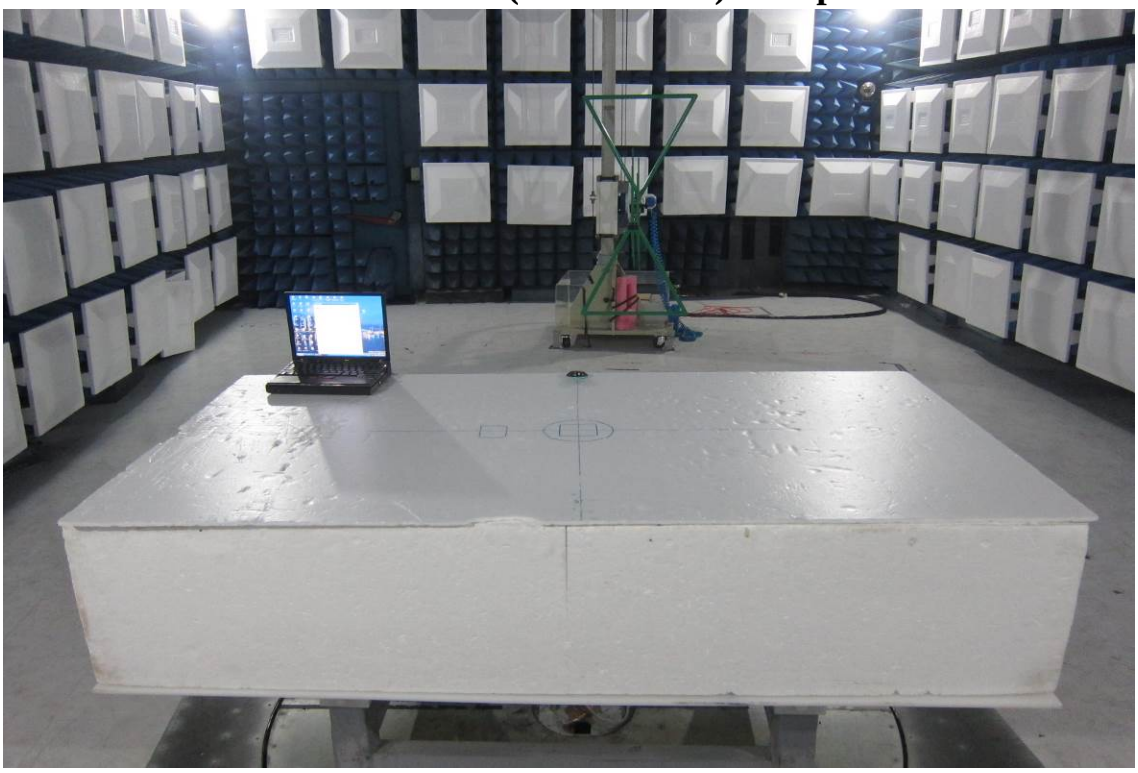
13.2. Antenna Connected Construction:

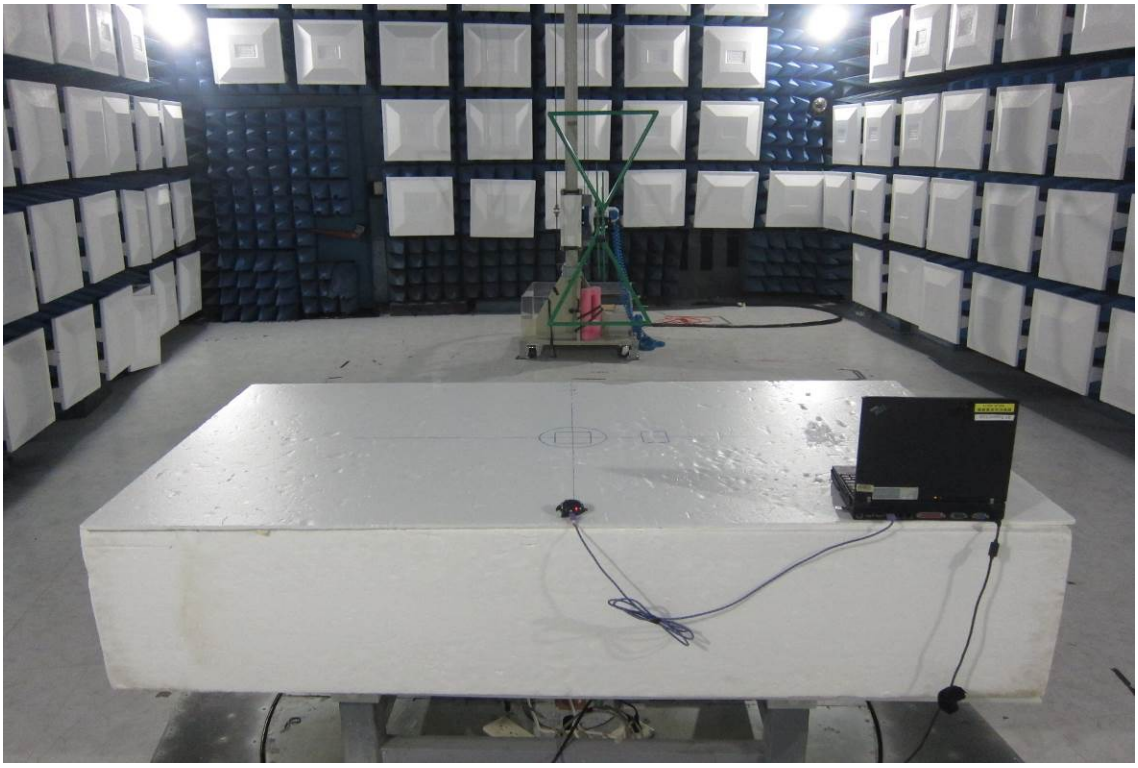
The directional gains of antenna used for transmitting is 2.2dBi, and the antenna type is chip antenna which is designed with permanent attachment and no consideration of replacement. Please see EUT photo for details.

APPENDIX 1

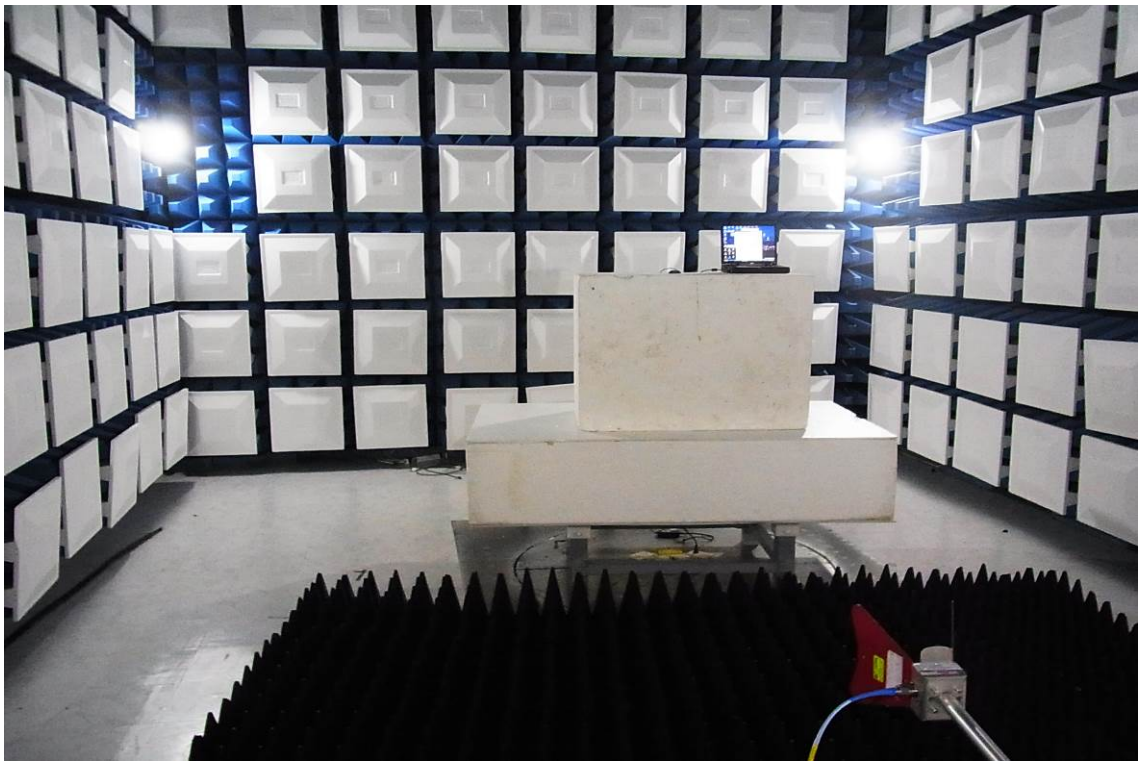
PHOTOGRAPHS OF SETUP

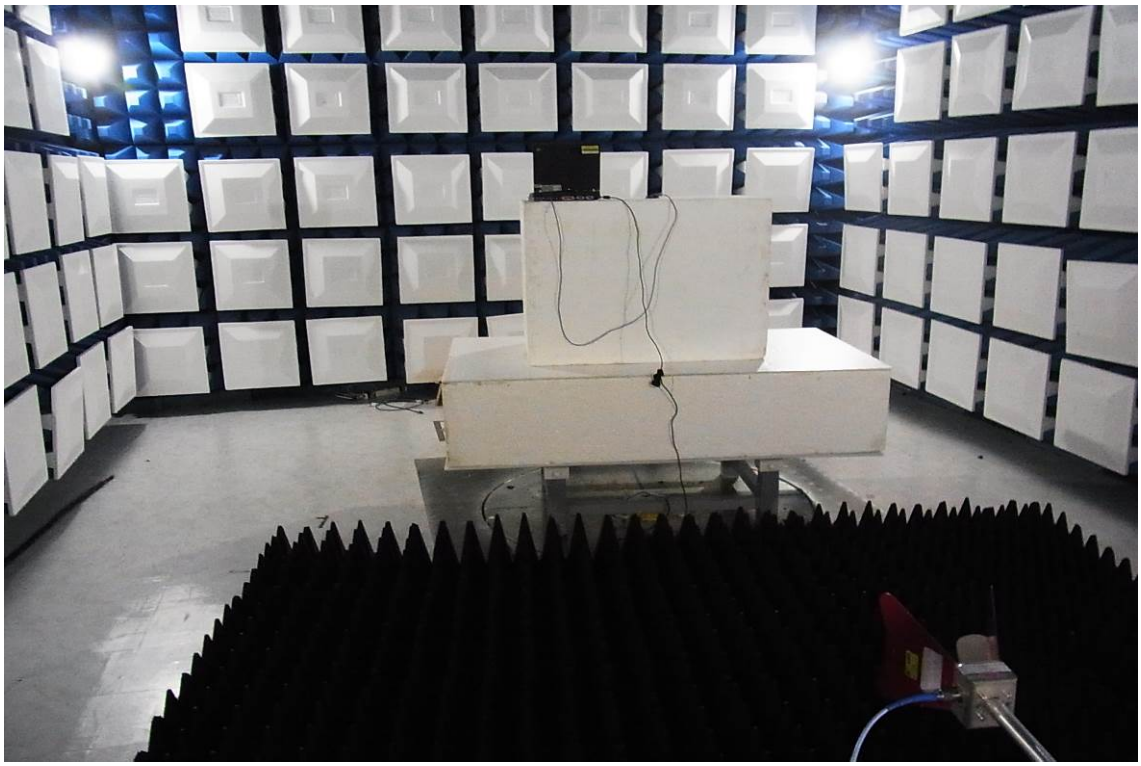
Radiated Emission (below 1GHz) Set up Photo



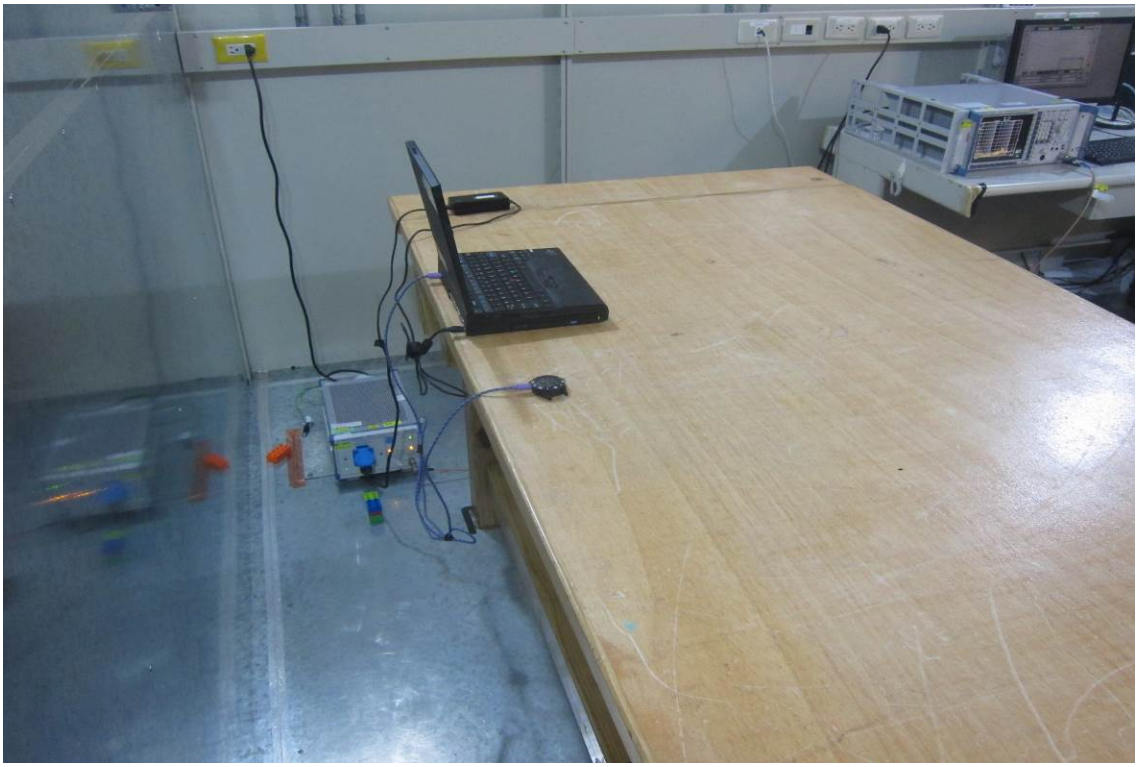


Radiated Emission (above 1GHz) Set up Photo





Conducted Emission Set up Photo



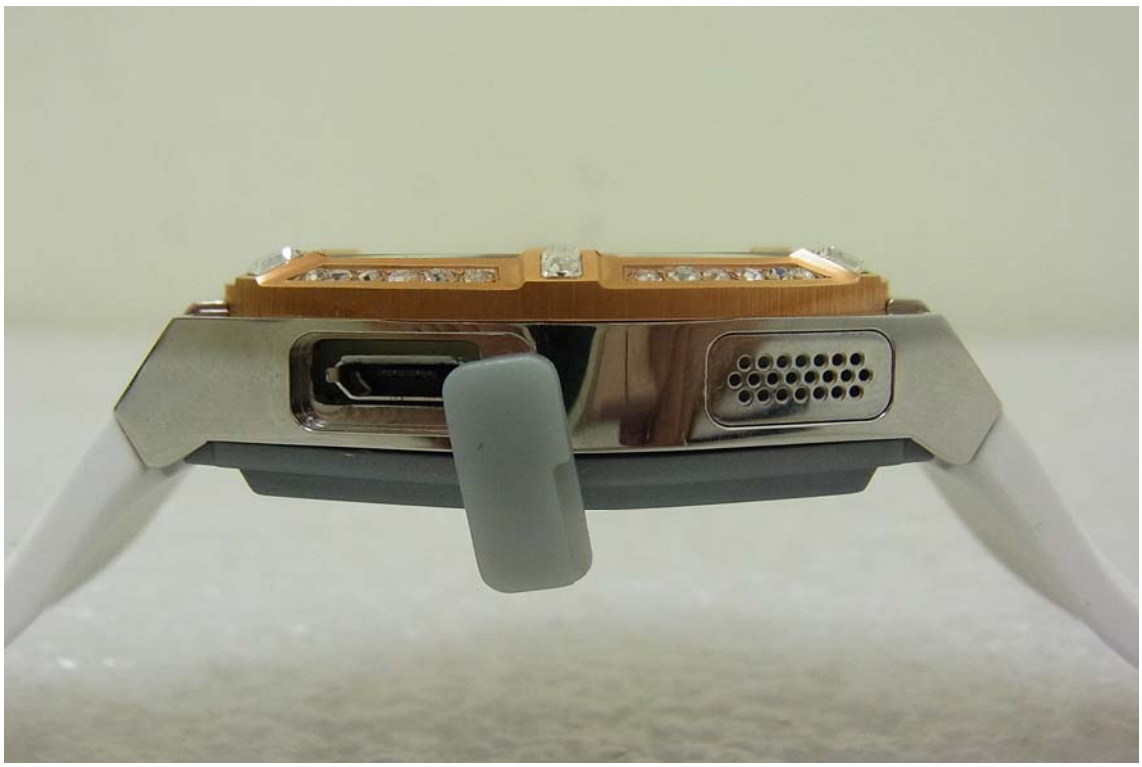
APPENDIX 2

PHOTOGRPHS OF EUT

EUT 1

EUT 2

EUT 3



EUT 4

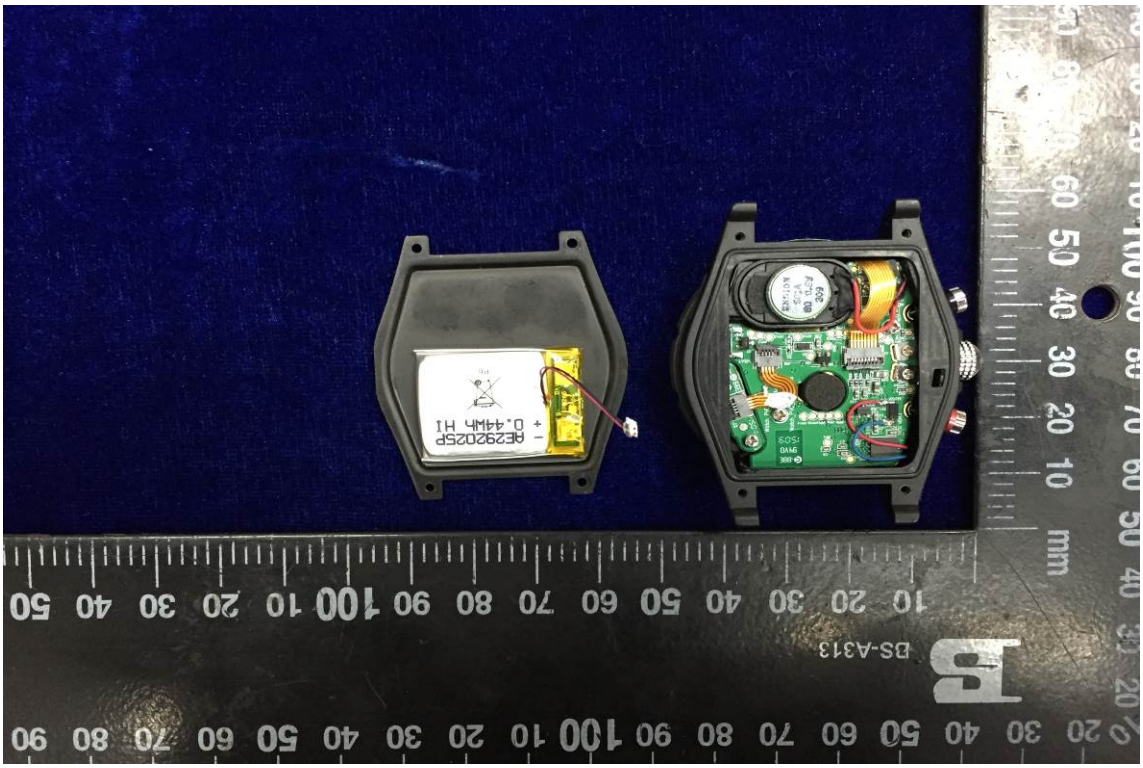
EUT 5

EUT 6

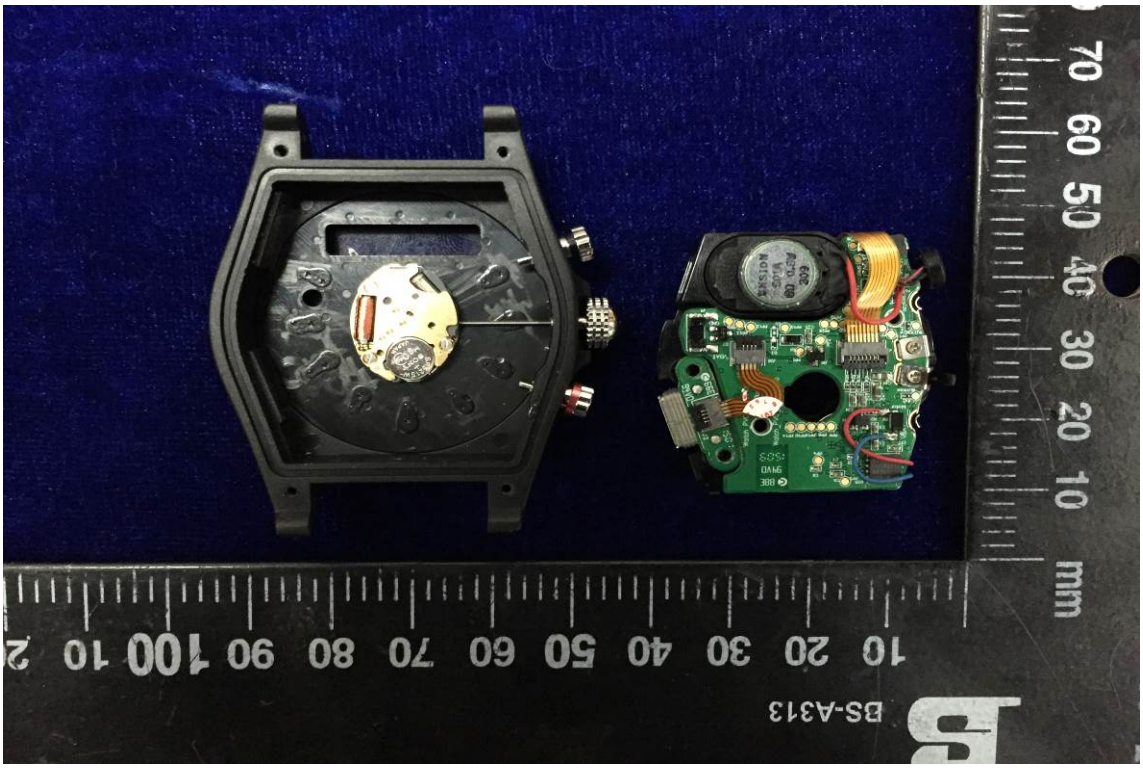
EUT 7

EUT 8

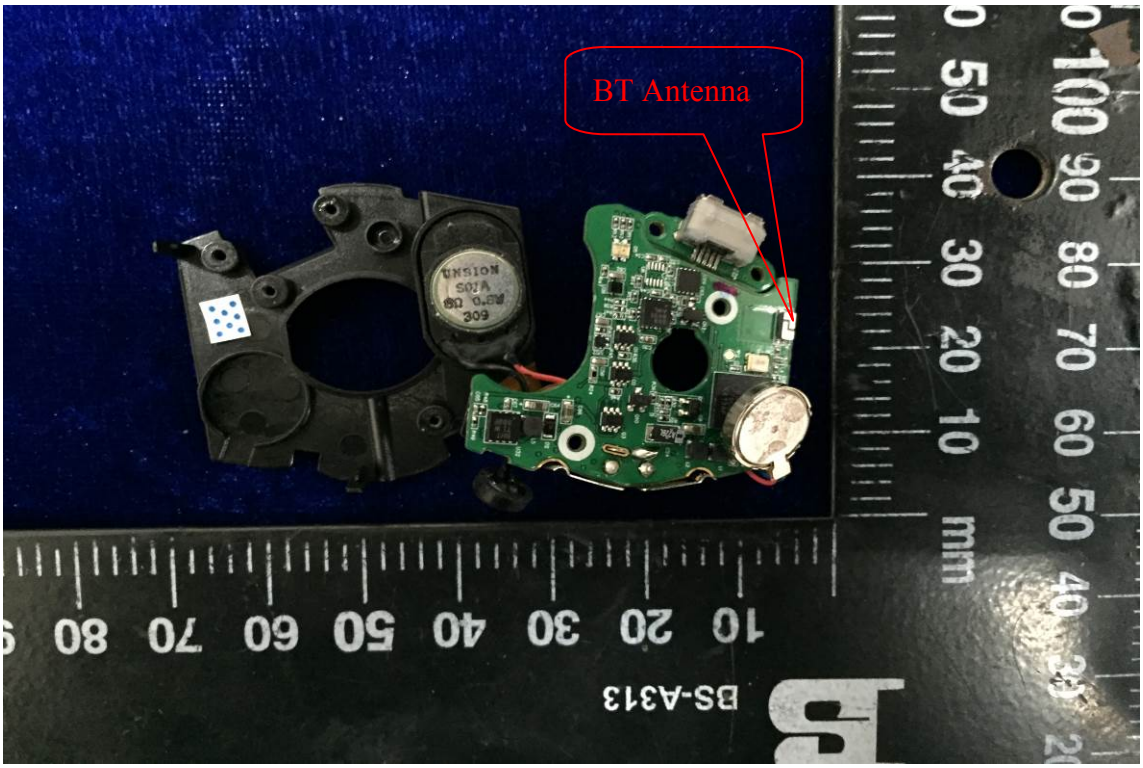
EUT 9



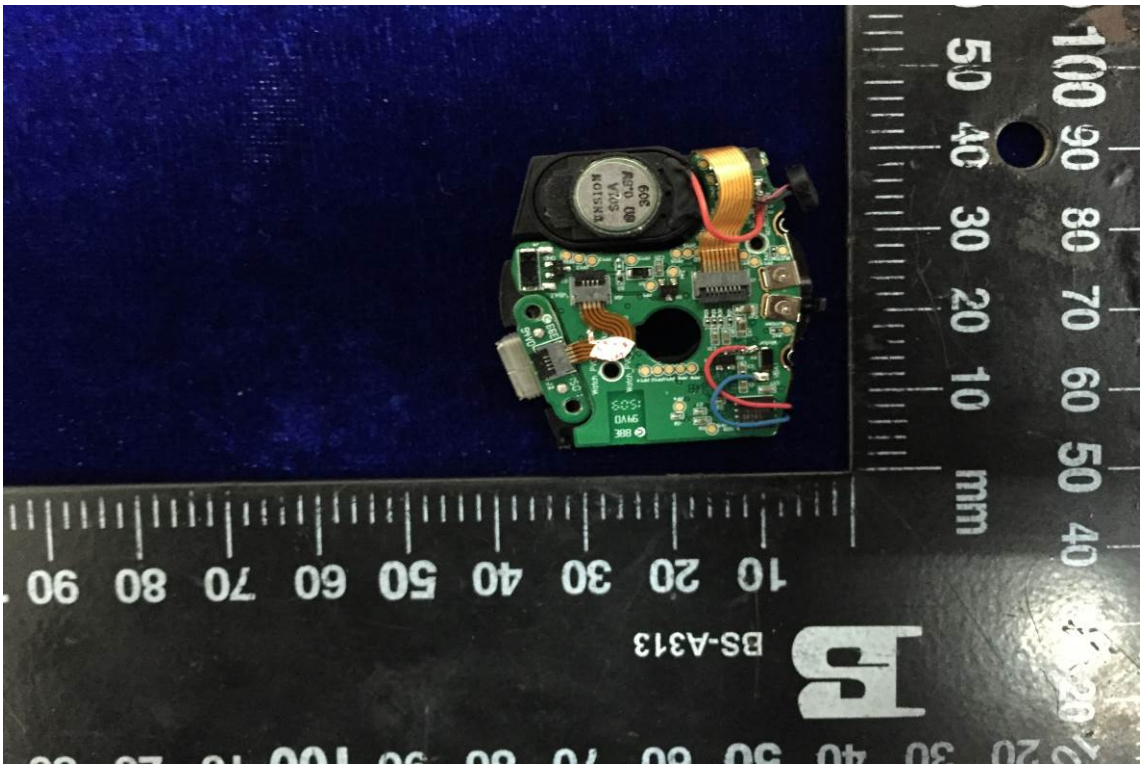
EUT 10



EUT 11



EUT 12



~ End of Report ~