LTA
Laboratory for Test & Approval Co.,Ltd.
243 Jubug-Ri,Yangji-Myeon, Yongin-Si, Gyeonggi-Do, Korea 17159
Tel: +82-31-323-6008 Fax: +82-31-323-6010
http://www.ltalab.com

Dates of Tests: Deember 28, 2018 ~ July 30, 2019
Test Report S/N: LR500111907K
Test Site : LTA CO., LTD.

CERTIFICATION OF COMPLIANCE

FCC ID. **2ASNMTOUCHXWALLET**

APPLICANT **SCTECHONE CO., Ltd.**

Equipment Class	:	**Digital Transmission System (DTS)**
Manufacturing Description	:	**TOUCH xWallet**
Manufacturer	:	**SCTECHONE Co., Ltd.**
Model name	:	**TOUCH xWallet**
Test Device Serial No.:	:	**Identical prototype**
Rule Part(s)	:	**FCC Part 15.247 Subpart C**
		ANSI C-63.10-2013
Frequency Range	:	**2402 ~ 2480 MHz**
Max. Output Power	:	**Max 2.08 dBm – Conducted**
Date of issue	:	**July 30, 2019**

This test report is issued under the authority of:

JaBeom.Koo

Ja-Beom, Koo / Manager

The test was supervised by:

Ja-Hum, Yeon / Test Engineer

This test result only responds to the tested sample. It is not allowed to copy this report even partly without the allowance of the test laboratory. The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

NVLAP LAB Code.: 200723-0

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1. General information

1-1 Test Performed

Company name : LTA Co., Ltd.
Address : 243, Jubug-ri,Yangji-Myeon,Youngin-Si, Kyunggi-Do, Korea. 17159
Web site : http://www.ltalab.com
E-mail : chahn@ltalab.com
Telephone : +82-31-323-6008
Facsimile +82-31-323-6010

Quality control in the testing laboratory is implemented as per ISO/IEC 17025 which is the "General requirements for the competents of calibration and testing laboratory".

1-2 Accredited agencies

LTA Co., Ltd. is approved to perform EMC testing by the following agencies:

Agency	Country	Accreditation No.	Validity	Reference
NVLAP	U.S.A	200723-0	2019-09-30	ECT accredited Lab.
RRA	KOREA	KR0049	-	EMC accredited Lab.
FCC	U.S.A	649054	2021-04-11	FCC CAB
VCCI	JAPAN	C-4948,	2020-09-10	VCCI registration
VCCI	JAPAN	T-2416,	2020-09-10	VCCI registration
VCCI	JAPAN	R-4483(10 m),	2020-10-15	VCCI registration
VCCI	JAPAN	G-847	2021-12-13	VCCI registration
IC	CANADA	5799A-1	2019-11-07	IC filing
KOLAS	KOREA	NO.551	2021-08-20	KOLAS accredited Lab.
NVLAP	U.S.A	200723-0	2021-08-20	ECT accredited Lab.

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2. Information about test item

2-1 Client & Manufacturer

Company name	:	SCTECHONE Co., Ltd.
Address	:	229, Dogok-ro, Gangnam-gu, Seoul.06230.

2-2 Equipment Under Test (EUT)

Model name	:	Touch xWallet
Serial number	:	Identical prototype
Date of receipt	:	December 28, 2018
EUT condition	:	Pre-production, not damaged
Antenna type	:	Patten Antenna (Max Gain : 5.30 dBi)
Frequency Range	:	2402 ~ 2480 MHz
RF output power	:	Max 2.08 dBm – Conducted
Number of channels	:	40
Type of Modulation	:	GFSK
Power Source	:	4.2 Vdc

2-3 Tested frequency

	LOW	MID	HIGH
Frequency (MHz)	2402	2442	2480

2-4 Ancillary Equipment

Equipment	Model No.	Serial No.	Manufacturer
Notebook	CR720	MS-1736	MSI

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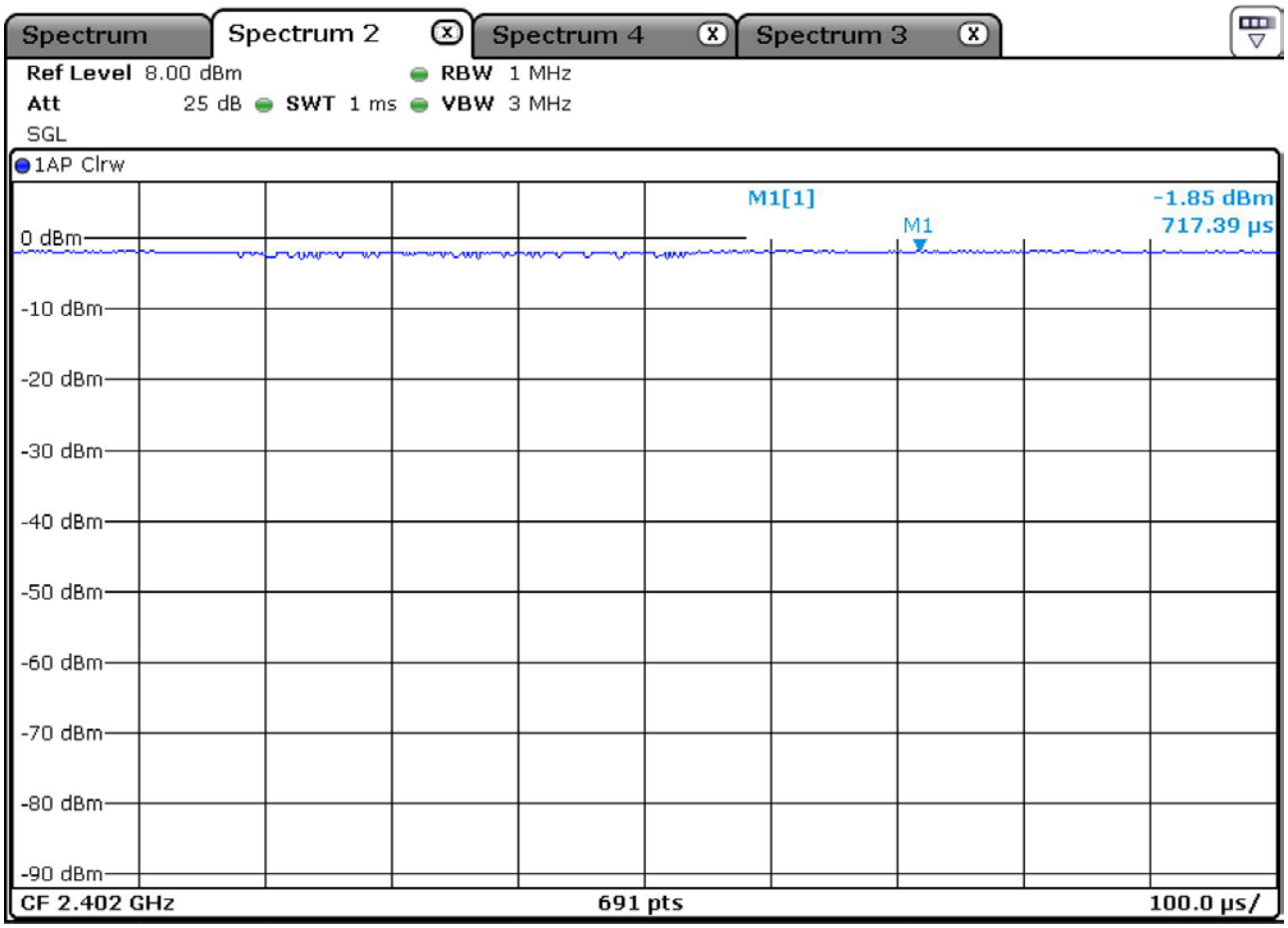
2-5 Duty Cycle

Test Mode	T_{on} (ms)	T_{on+off} (ms)	Duty Cycle (%)
BLE	100	100	100



3. Test Report

3.1 Summary of tests

FCC Part Section(s)	Parameter	Limit	Test Condition	Status (note 1)
15.247(a)	6 dB Bandwidth	> 500 kHz	Conducted	C
15.247(b)	Transmitter Peak Output Power	< 1 Watt		C
15.247(e)	Transmitter Power Spectral Density	< 8 dBm @ 3 kHz		C
15.247(d)	Band Edge	> 20 dBc		C
	Conducted Spurious Emissions	> 20 dBc		C
15.209(a)	Radiated Spurious Emissions	0n page 23	Radiated	C
15.207	AC Conducted Emissions	Emissions	Conducted	NA
15.203	Antenna requirement	-	-	C

Note 1: C=Complies NC=Not Complies NT=Not Tested NA=Not Applicable

Note 2: This product operates only with battery

The above equipment was tested by LTA Co., Ltd. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10-2013 and the energy emitted by the sample EUT tested as described in this report is in compliance with the requirements of FCC Rules Part 2 and Part 15.247 The test results of this report relate only to the tested sample identified in this report.

Frequency range to be scanned:

0.15 MHz - 30 MHz as conducted measurement

30 MHz to 5th harmonic of the highest frequency or 40 GHz, whichever is lower as radiated measurement.

Bandwidth:

Measured by the CISPR quasi-peak function Bandwidth is 9 kHz in the frequency 0.15 MHz to 30 MHz and 120 kHz in the frequency 30 MHz to 1,000 MHz.

Measured by the Peak function Bandwidth is 1 MHz in the frequency 1 GHz to 40 GHz.

A sample calculation:

COR. F (correction factor)= Antenna factor + Cable loss- Amp.gain- Distance correction

Emission Level= meter reading + COR.F

→ Antenna Requirement

SCTECHONE Co., Ltd. FCC ID: 2ASNMTOUCHXWALLET unit complies with the requirement of §15.203. The antenna type is Pattern Antenna.

3.2 Technical Characteristics Test

3.2.1 6 dB Bandwidth

Procedure:

The bandwidth at 6 dB below the highest in-band spectral density was measured with a spectrum analyzer connected to the antenna terminal, while EUT is operating in transmission mode at the appropriate frequencies.

After the trace being stable, Use the marker-to-peak function to set the marker to the peak of the emission. Use the marker-delta function to measure 6 dB down one side of the emission. Reset the marker-delta function, and move the marker to the other side of the emission, until it is (as close as possible to) even with the reference marker level. The marker-delta reading at this point is the 6 dB bandwidth of the emission.

The spectrum analyzer is set to:

Center frequency = the highest, middle and the lowest channels

RBW = 100 kHz

VBW = 300 kHz (VBW ≥ 3*RBW)

Trace = max hold

Span = 5 MHz

Sweep = auto

Detector function = peak

Measurement Data : Complies

Frequency (MHz)	Test Results	
	Measured Bandwidth (MHz)	Result
2402	**0.694**	Complies
2442	**0.687**	Complies
2480	**0.694**	Complies

- See next pages for actual measured spectrum plots.

Minimum Standard:

6 dB Bandwidth > 500 kHz

Measurement Setup

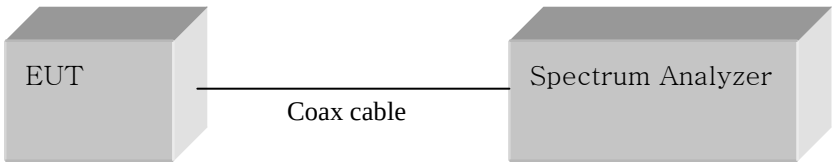
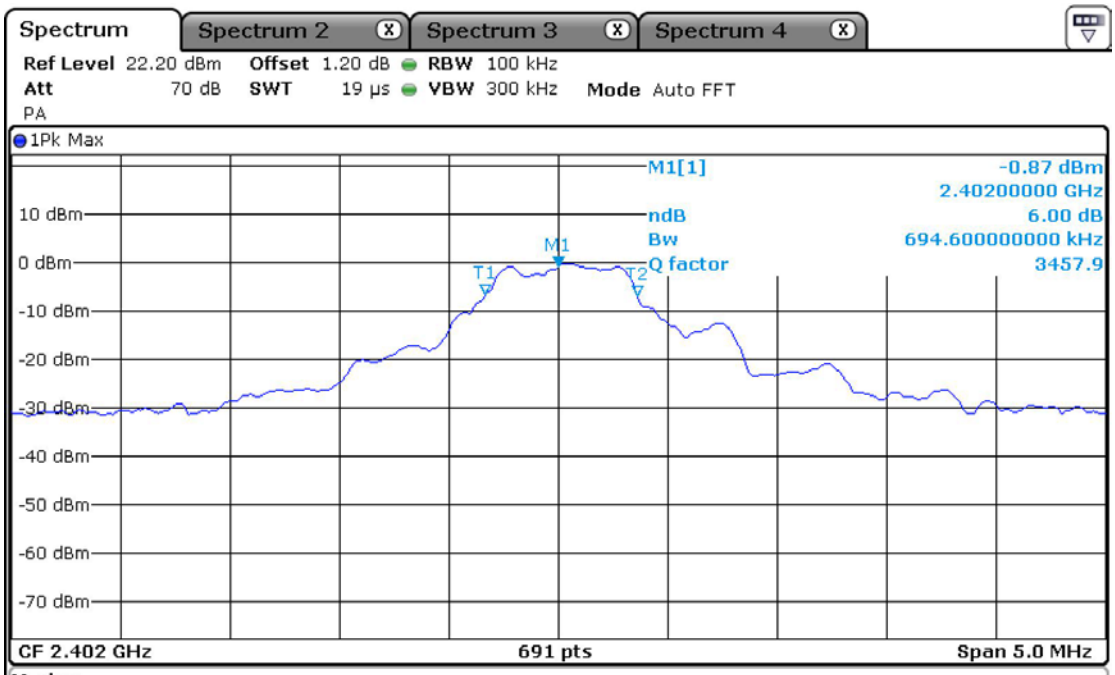


Figure 1: Measurement setup for the carrier frequency separation

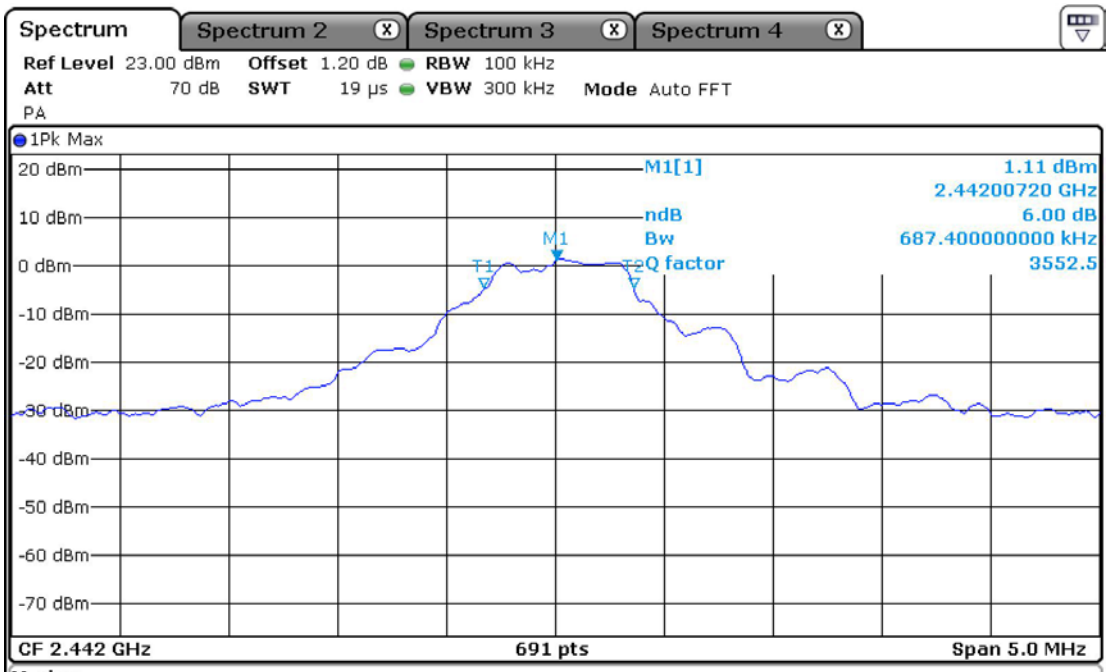
Low Channel



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.402 GHz	-0.87 dBm	ndB down	694.6 kHz
T1		1	2.4016671 GHz	-6.70 dBm	ndB	6.00 dB
T2		1	2.4023618 GHz	-7.02 dBm	Q factor	3457.9

Middle Channel



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.4420072 GHz	1.11 dBm	ndB down	687.4 kHz
T1		1	2.4416744 GHz	-4.84 dBm	ndB	6.00 dB
T2		1	2.4423618 GHz	-4.75 dBm	Q factor	3552.5

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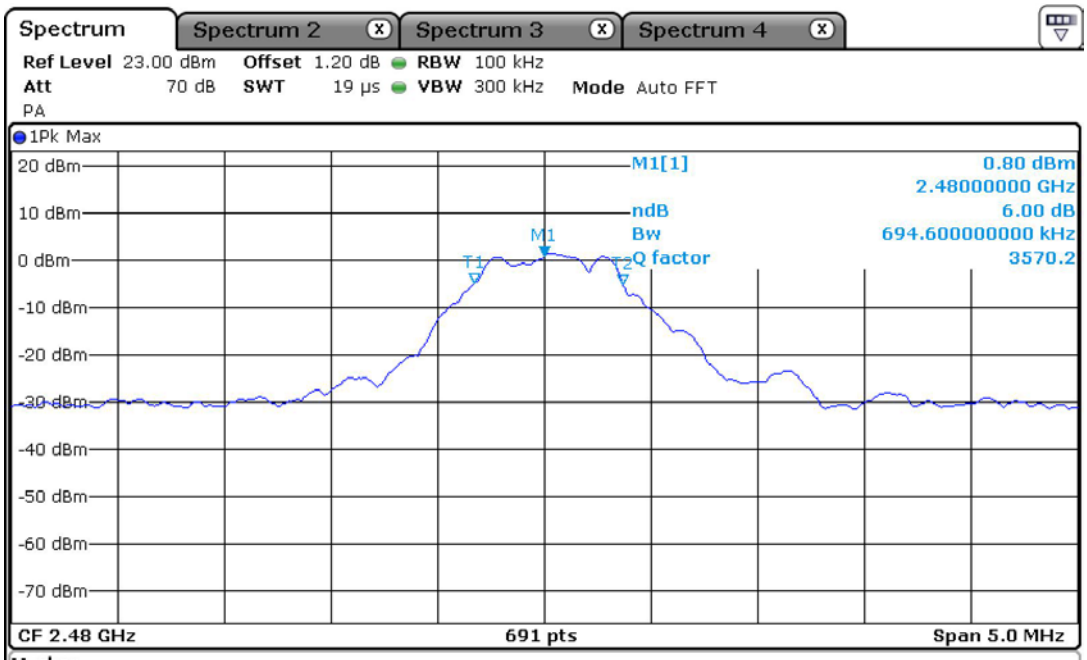
High Channel



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.48 GHz	0.80 dBm	ndB down	694.6 kHz
T1		1	2.4796744 GHz	-5.12 dBm	ndB	6.00 dB
T2		1	2.480369 GHz	-5.15 dBm	Q factor	3570.2

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3.2.2 Output Power Measurement

Procedure:

The maximum peak output power was measured with the spectrum analyzer connected to the antenna output of the EUT. The spectrum analyzer's over a bandwidth greater than or equal to the 99 % bandwidth. The EUT was operating in transmit mode at the appropriate center frequency.

The spectrum analyzer is set to(Peak):

Center frequency = the highest, middle and the lowest channels

RBW = 1 MHz Span = auto

VBW = 3 MHz (VBW ≥ 3 * RBW) Sweep = auto

Detector function = peak

The spectrum analyzer is set to(Average):

Center frequency = the highest, middle and the lowest channels

RBW = 1 MHz Span = auto

VBW = 3 MHz (VBW ≥ 3 * RBW) Sweep = auto

Detector function = RMS

Measurement Data : Complies

Frequency (MHz)	Test Results				
	dBm(AV / Peak)		mW (AV / Peak)		Result
2402	1.53	2.08	1.42	1.61	Complies
2442	0.66	1.65	1.16	1.46	Complies
2480	-1.61	1.28	0.69	1.34	Complies

- See next pages for actual measured spectrum plots.

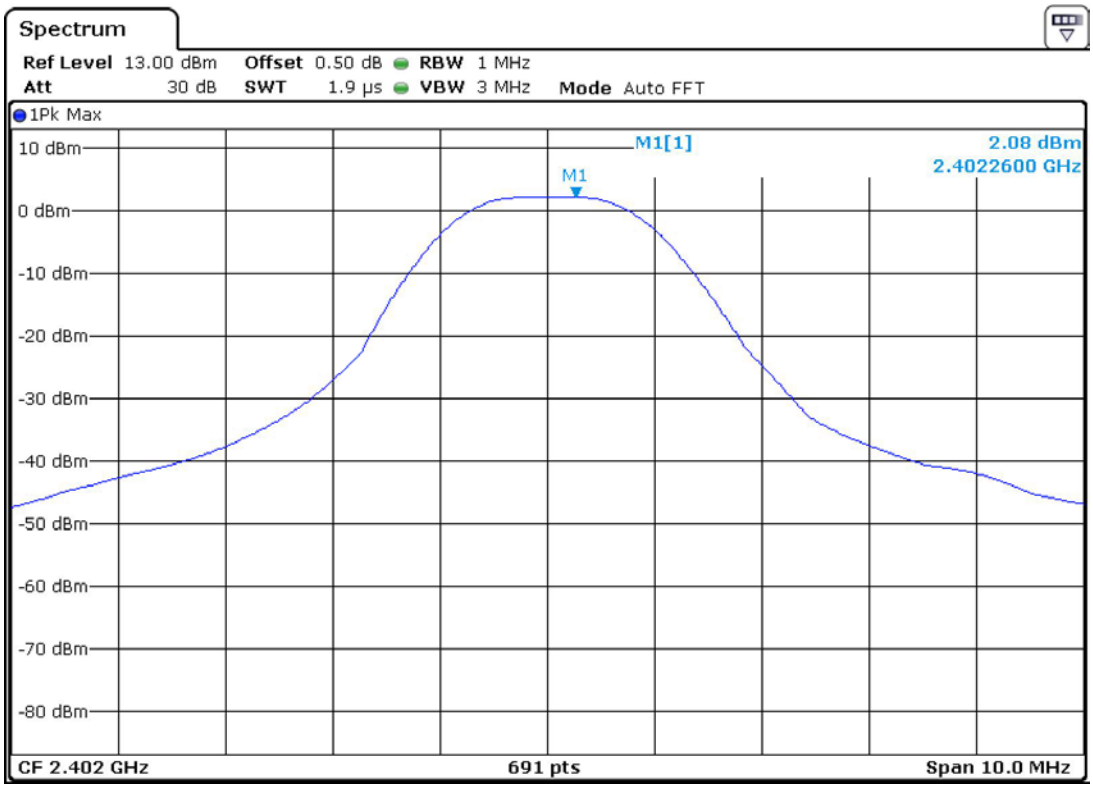
Minimum Standard:

Peak output power	< 1 W

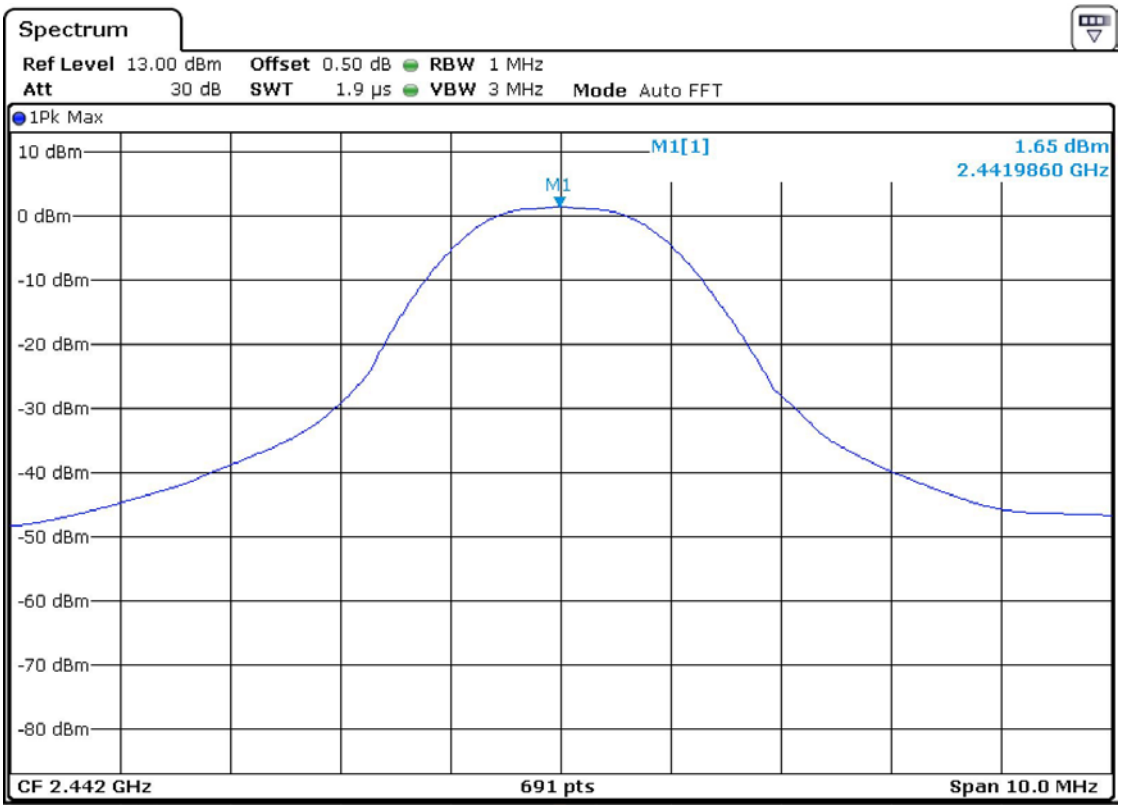
Measurement Setup

Same as the Chapter 3.2.1 (Figure 1)

Low Channel(Peak)



Middle Channel(Peak)



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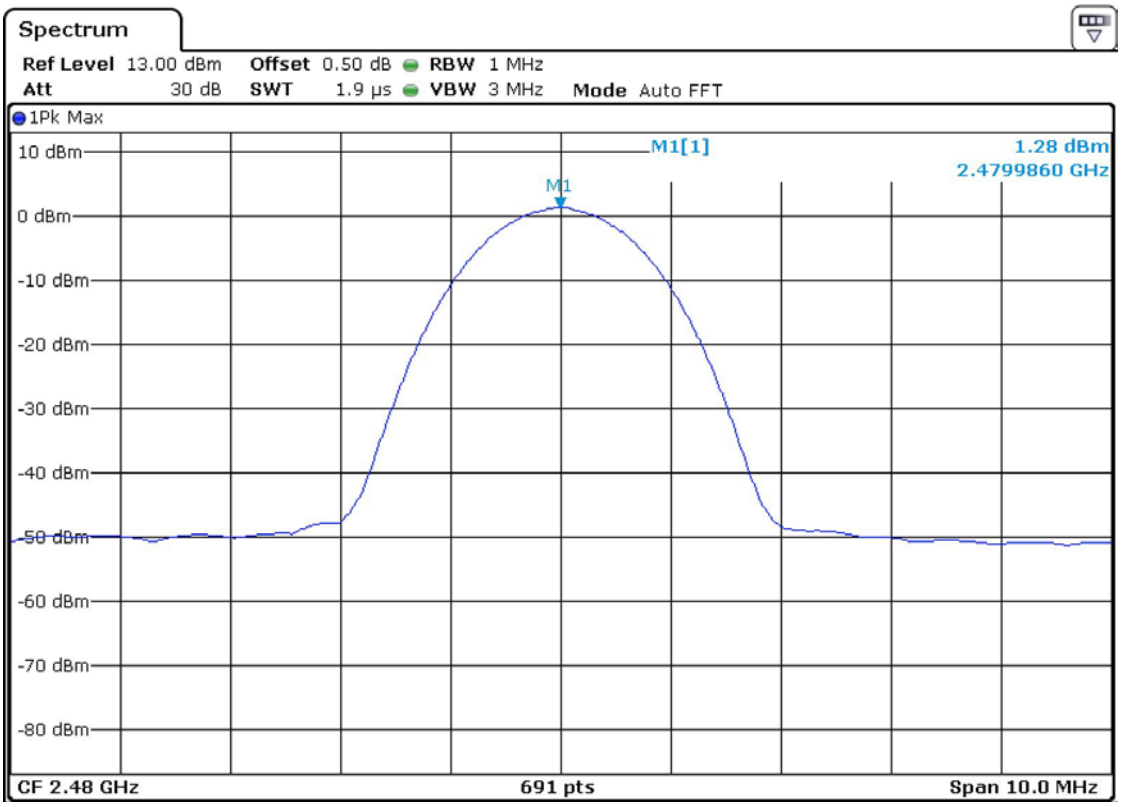
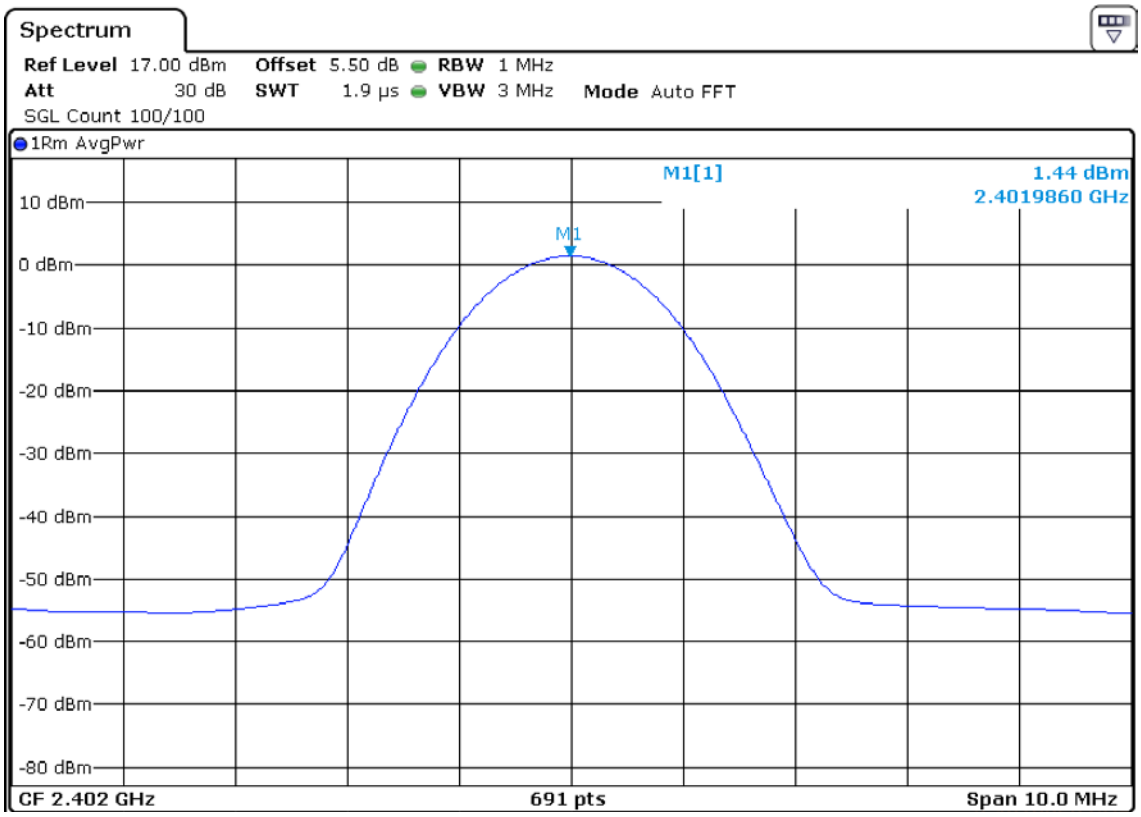
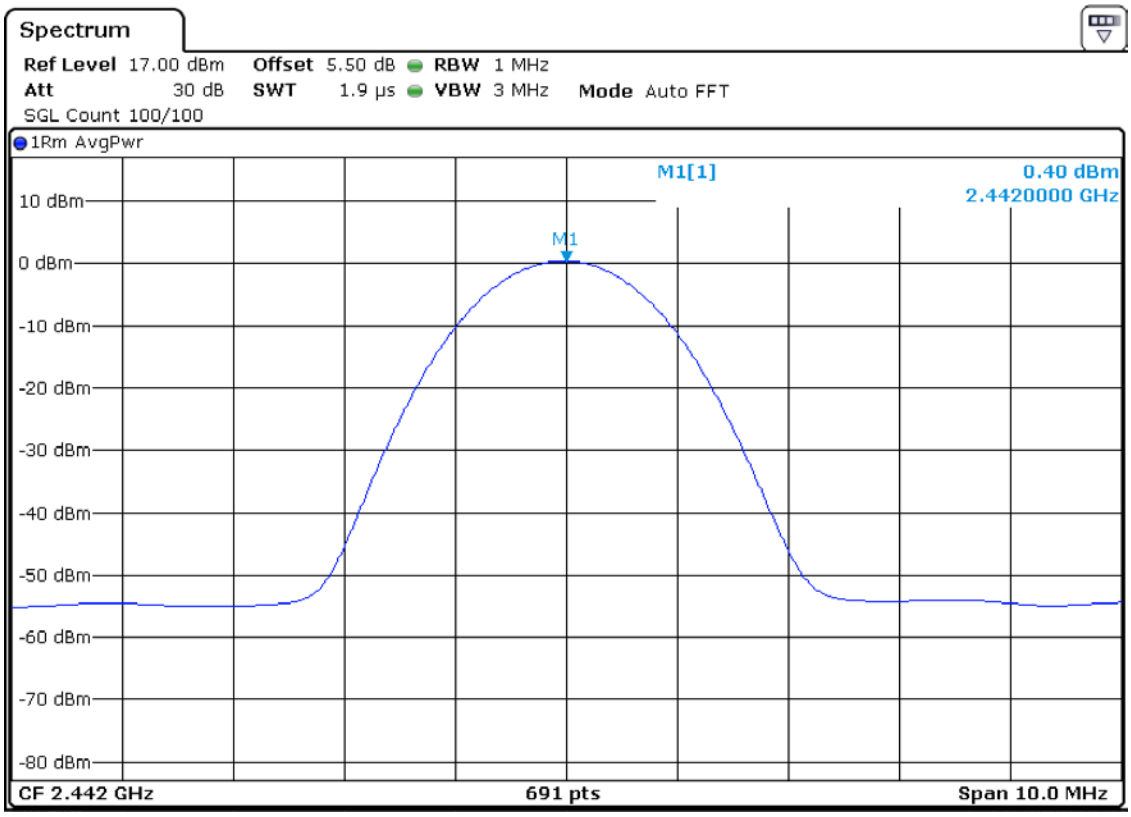
High Channel(Peak)



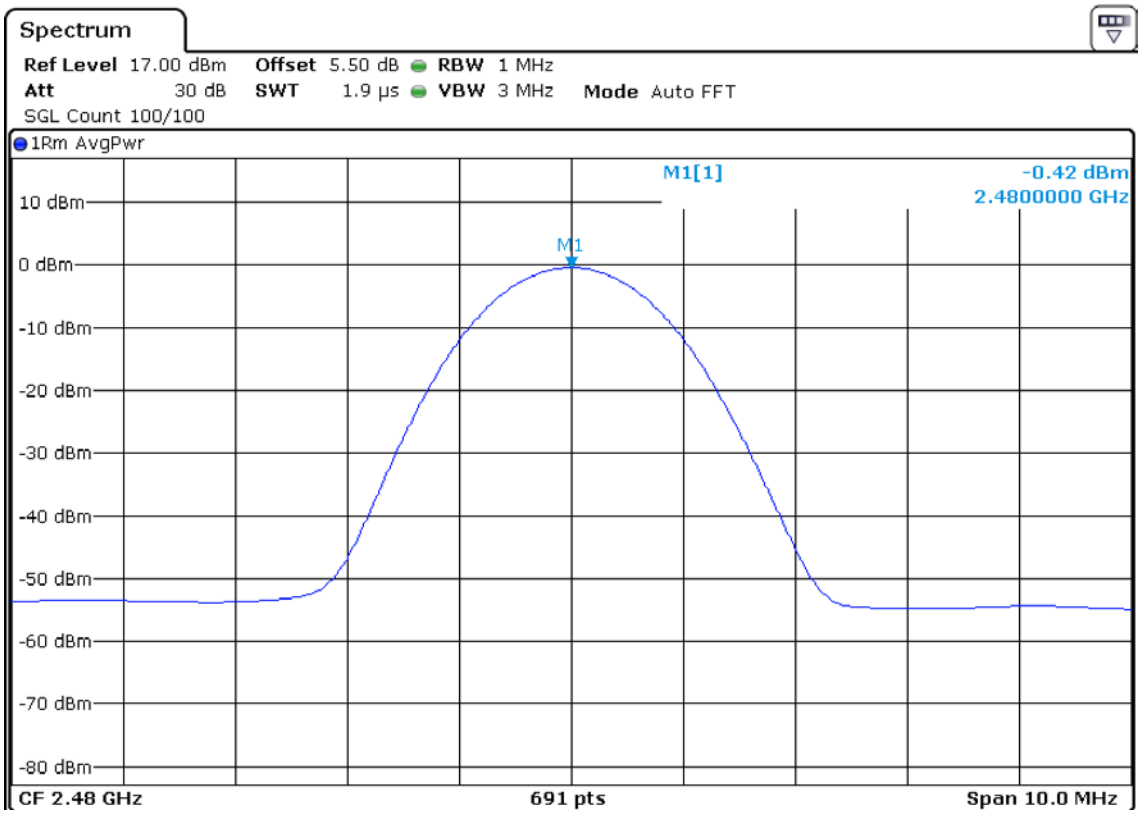
Low Channel(Average)



Middle Channel(Average)



High Channel(Average)



3.2.3 Power Spectral Density

Procedure:

The peak power density is measured with a spectrum analyzer connected to the antenna terminal while the EUT is operating in transmission mode at the appropriate frequencies.

The spectrum analyzer is set to:

RBW = 3 kHz (3kHz≤RBW≤100kHz) Span = 1.5 times the DTS bandwidth

VBW = 10 kHz (3 * RBW) Sweep = auto

Detector function = peak Trace = max hold

Measurement Data : Complies

Frequency (MHz)	Test Results	
	dBm	Result
2402	**-15.94**	Complies
2442	**-15.44**	Complies
2480	**-13.12**	Complies

- See next pages for actual measured spectrum plots.

Minimum Standard:

Power Spectral Density	< 8 dBm @ 3 kHz BW

Measurement Setup

Same as the Chapter 3.2.1 (Figure 1)

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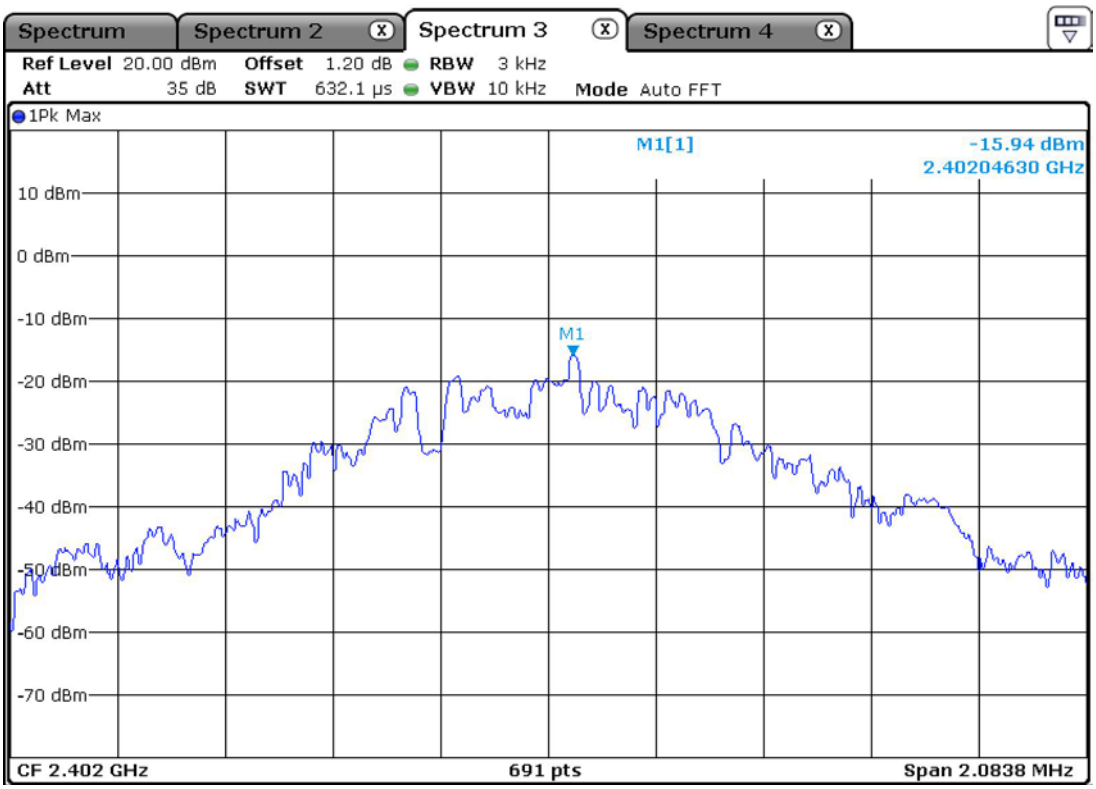
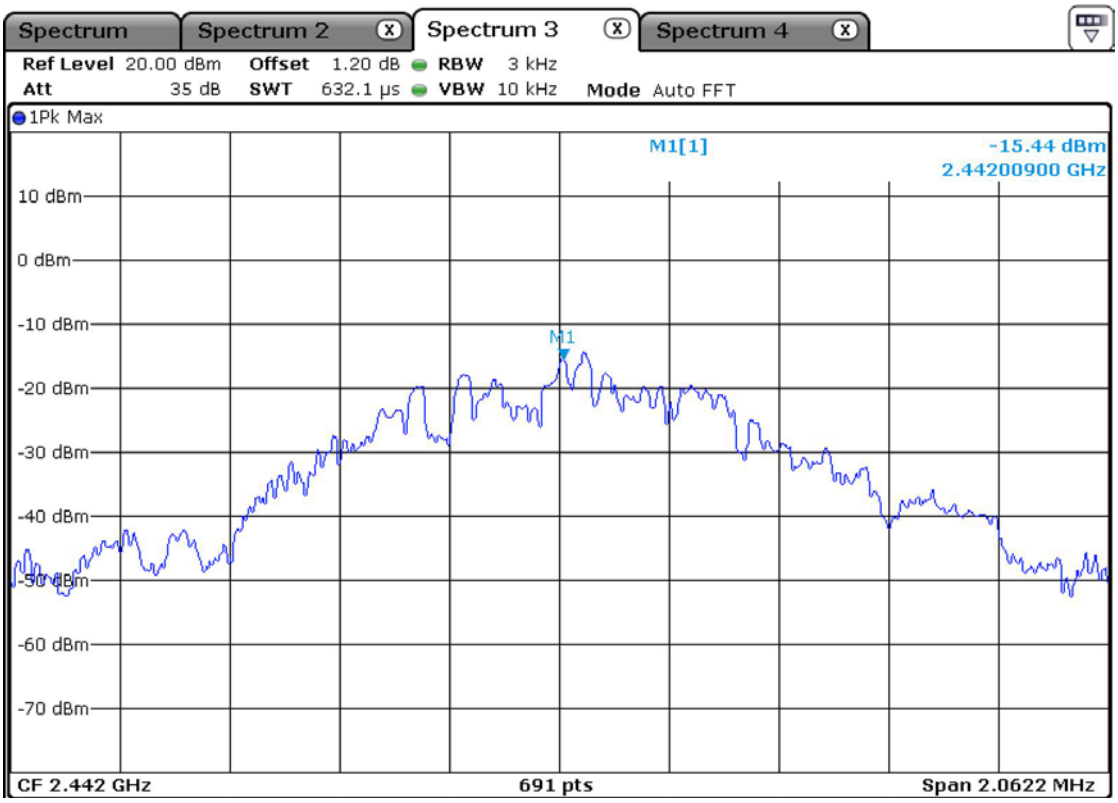
Power Density Measurement

Low Channel



Middle Channel



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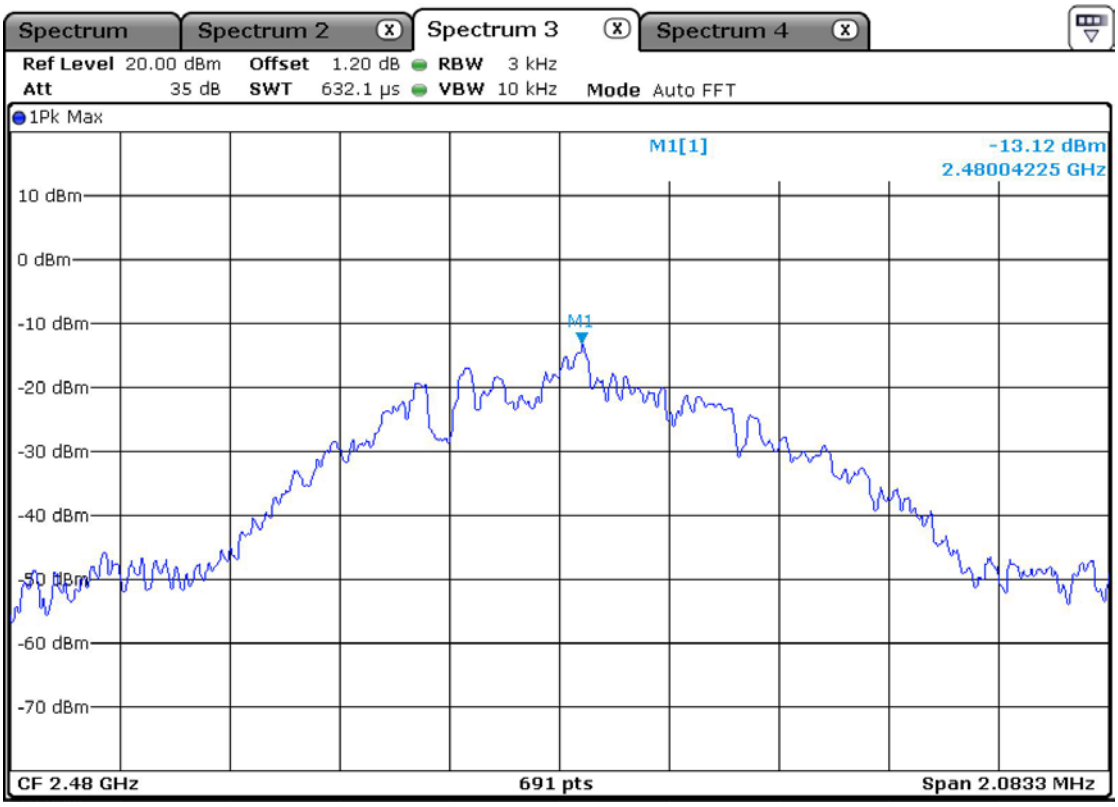
High Channel



3.2.4 Band Edge

Procedure:

The bandwidth at 20 dB down from the highest inband spectral density is measured with a spectrum analyzer connected to the antenna terminal, while EUT is operating in transmission mode at the appropriate frequencies.

After the trace being stable, Use the marker-to-peak function to measure 20 dB down both sides of the intentional emission.

The spectrum analyzer is set to:

Center frequency = the highest, middle and the lowest channels

RBW = 100 kHz	VBW = 100 kHz
Span = 40 MHz, 100 MHz	Detector function = peak
Trace = max hold	Sweep = auto

Radiated emissions which fall in the restricted bands, as defined in 15.205(a), must also comply with the radiated emission limits specified in 15.209(a)

The spectrum analyzer is set to:

Center frequency = the highest, the lowest channels

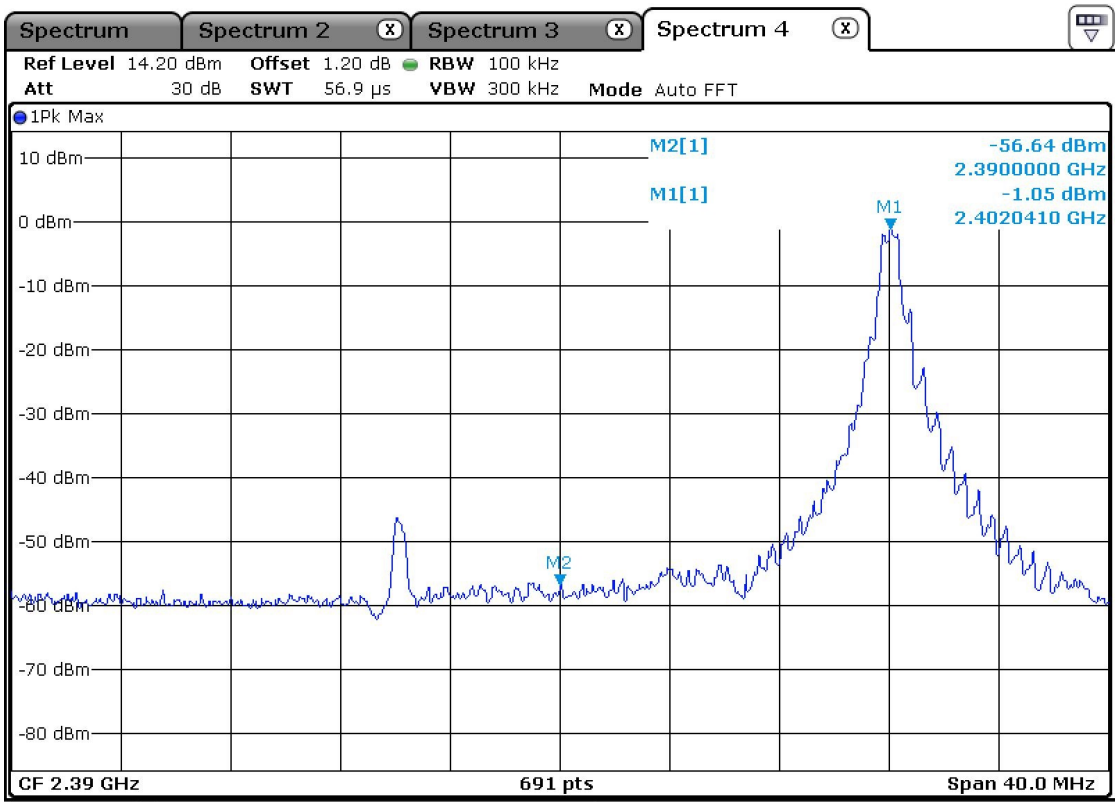
PEAK:	RBW = VBW = 1 MHz, Sweep=Auto
Average:	RBW = 1 MHz, VBW = 10 Hz, Sweep=Auto
Measurement Distance:	3 m
Polarization:	Horizontal / Vertical

Measurement Data: Complies

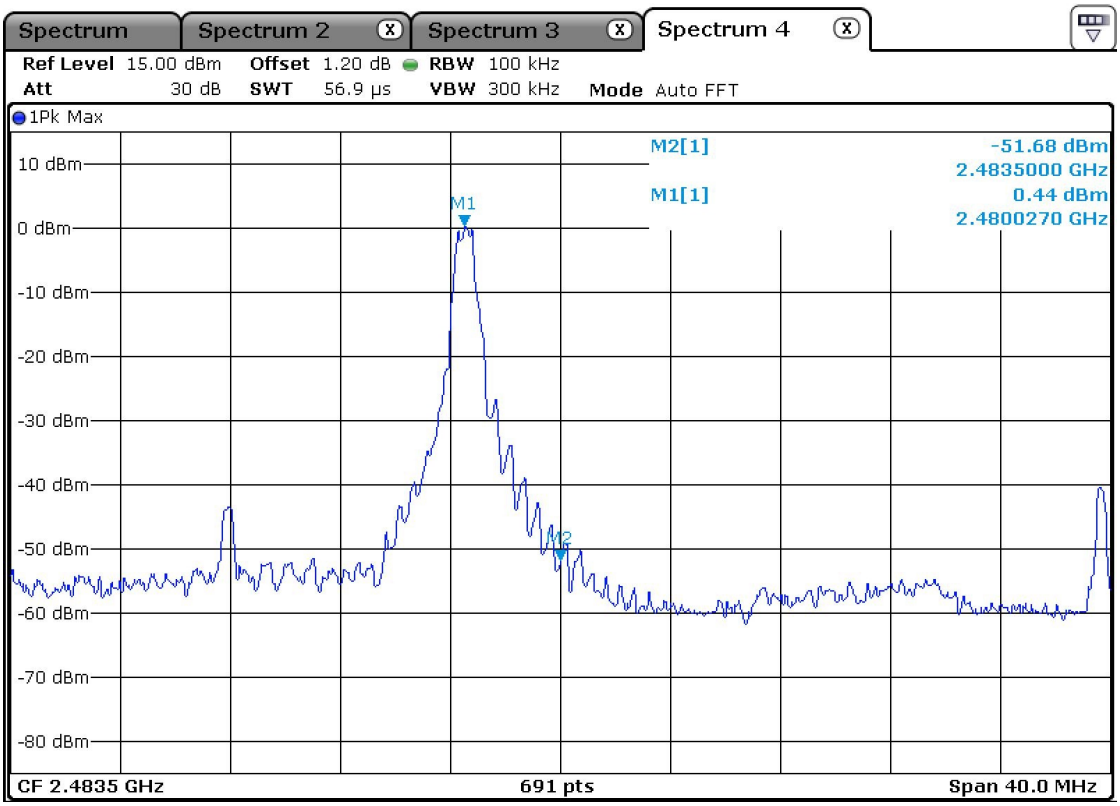
- All conducted emission in any 100 kHz bandwidth outside of the spread spectrum band was at least 20 dB lower than the highest inband spectral density. Therefore the applying equipment meets the require ment.
- See next pages for actual measured spectrum plots.

Minimum Standard:	> 20 dBc

Lower edge



Upper edge



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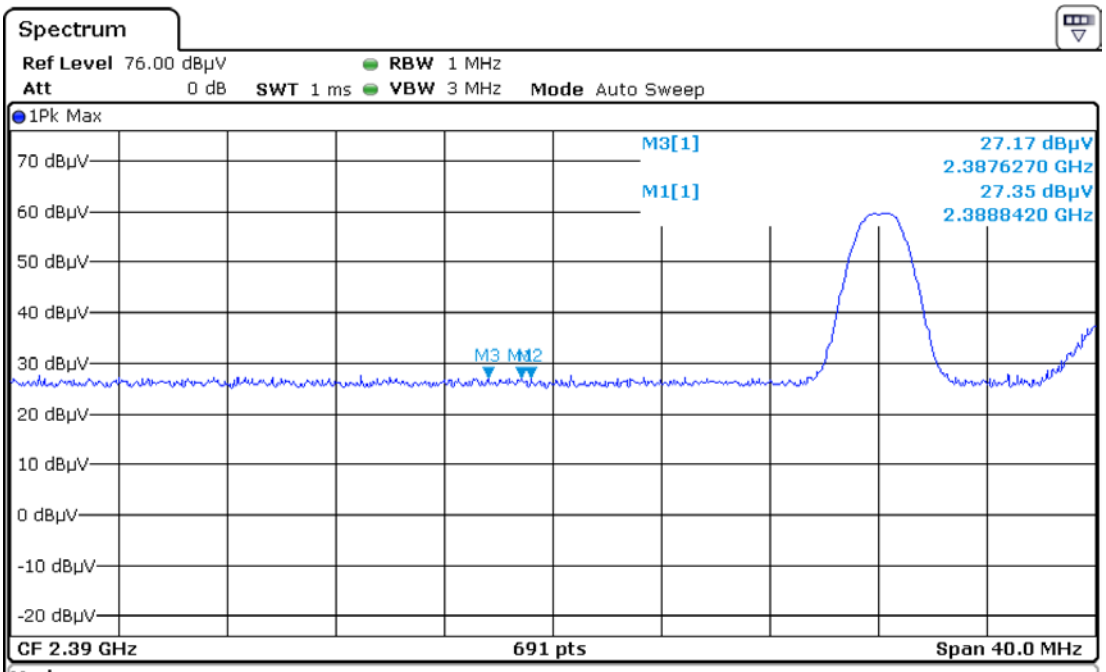
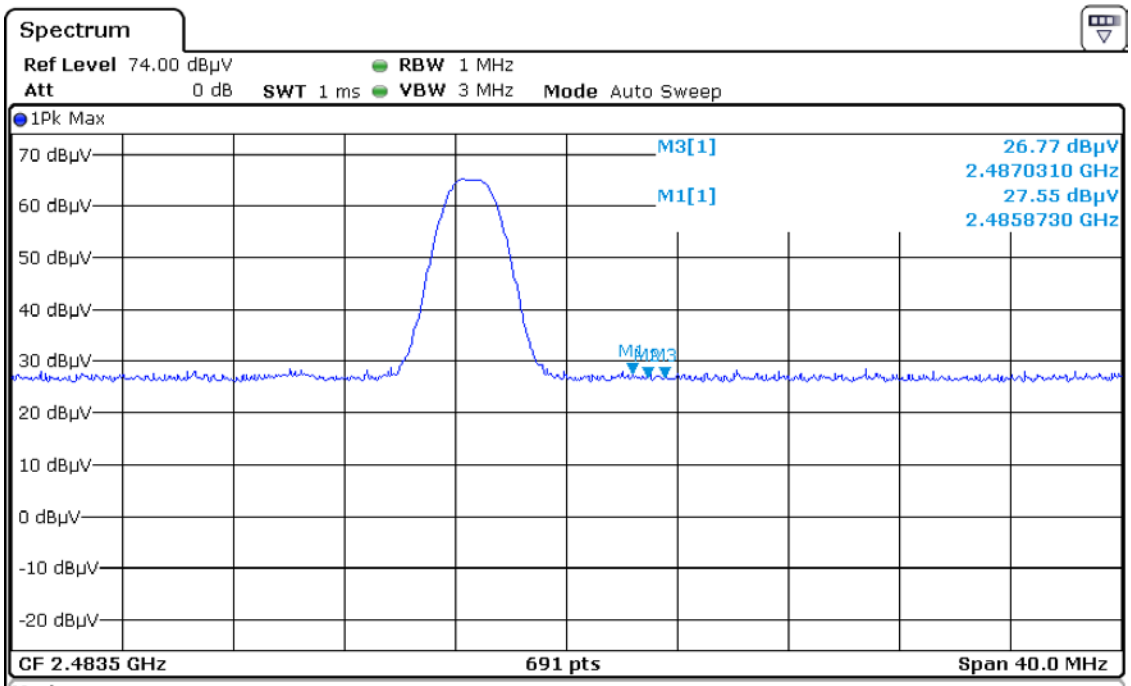
Radiated emissions Lower edge



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.388842 GHz	27.35 dBµV		
M2		1	2.38919 GHz	27.27 dBµV		
M3		1	2.387627 GHz	27.17 dBµV		

Radiated emissions Upper edge



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.485873 GHz	27.55 dBµV		
M2		1	2.486452 GHz	26.98 dBµV		
M3		1	2.487031 GHz	26.77 dBµV		

Radiated Band-edges in the restricted band 2310-2390 MHz measurement

Frequency [MHz]	Reading [dBuV/m] AV	Reading [dBuV/m] Peak	Pol.	Correction Factor Antenna	Correction Factor Amp. Gain + Cable Loss	Limits [dBuV/m] AV	Limits [dBuV/m] Peak	Result [dBuV/m] AV	Result [dBuV/m] Peak	Margin [dB] AV	Margin [dB] Peak
2388.8	22.15	27.35	H	28.08	8.77	54	74	41.46	46.66	12.54	27.34
2389.2	22.08	27.27	H	28.09	8.78	54	74	41.39	46.58	12.61	27.42
2387.6	21.94	27.17	H	28.08	8.77	54	74	41.25	46.48	12.75	27.52

Radiated Band-edges in the restricted band 2483.5-2500 MHz measurement

Frequency [MHz]	Reading [dBuV/m] AV	Reading [dBuV/m] Peak	Pol.	Correction Factor Antenna	Correction Factor Amp. Gain + Cable Loss	Limits [dBuV/m] AV	Limits [dBuV/m] Peak	Result [dBuV/m] AV	Result [dBuV/m] Peak	Margin [dB] AV	Margin [dB] Peak
2485.9	22.34	27.55	H	27.88	8.57	54	74	41.65	46.86	12.35	27.14
2486.5	21.86	26.98	H	27.88	8.57	54	74	41.17	46.29	12.83	27.71
2487	21.65	26.77	H	27.88	8.57	54	74	40.96	46.08	13.04	27.92

Note : This EUT was tested in 3 orthogonal positions and the worst-case data was presented

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3.2.5 Conducted Spurious Emissions

Procedure:

The test follows KDB558074. The conducted spurious emissions were measured with a spectrum analyzer connected to the antenna terminal, while EUT had its hopping function disabled at the highest, middle and the lowest available channels..

After the trace being stable, set the marker on the peak of any spurious emission recorded.

The spectrum analyzer is set to:

Span = wide enough to capture the peak level of the in-band emission and all spurious emissions

RBW = 100 kHz Sweep = auto

VBW = 300 kHz Detector function = peak

7Trace = max hold

Measurement Data: Complies

- All conducted emission in any 100 kHz bandwidth outside of the spread spectrum band was at least 20 dB lower than the highest inband spectral density. Therefore the applying equipment meets the require ment.
- See next pages for actual measured spectrum plots.

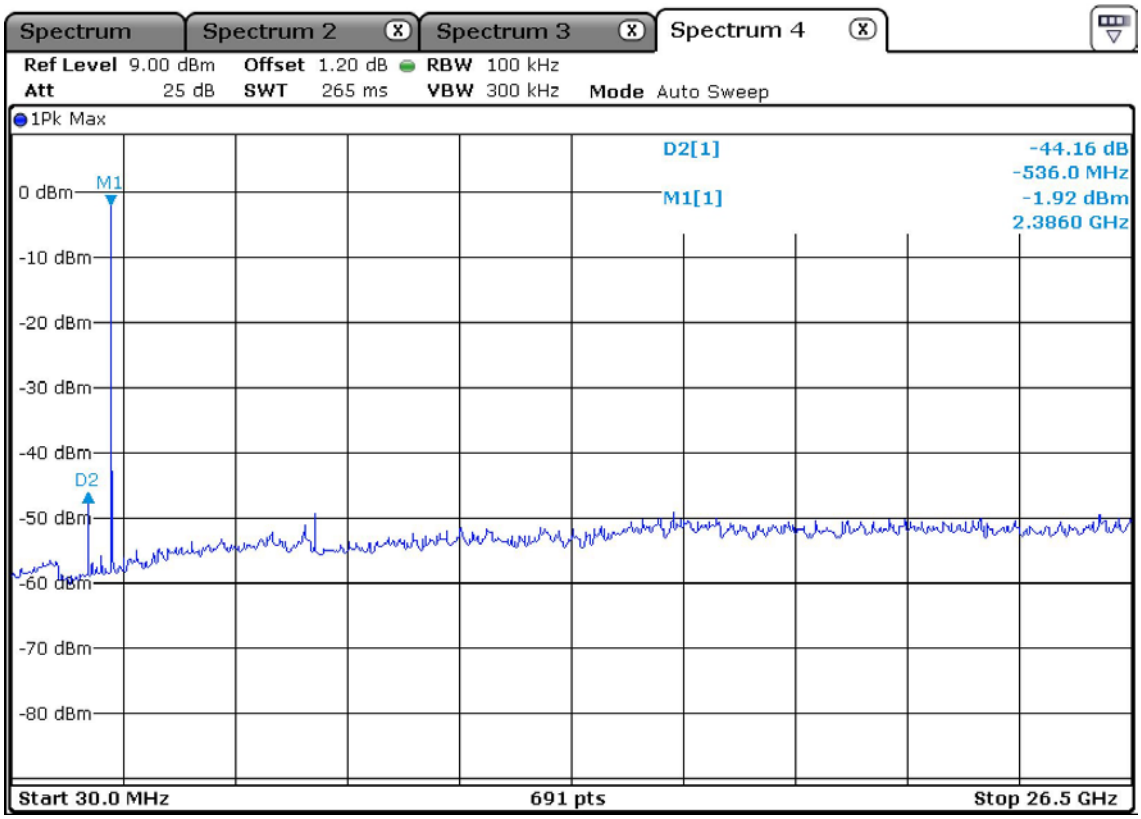
Minimum Standard:	> 20 dBc

Measurement Setup

Same as the Chapter 3.2.1 (Figure 1)

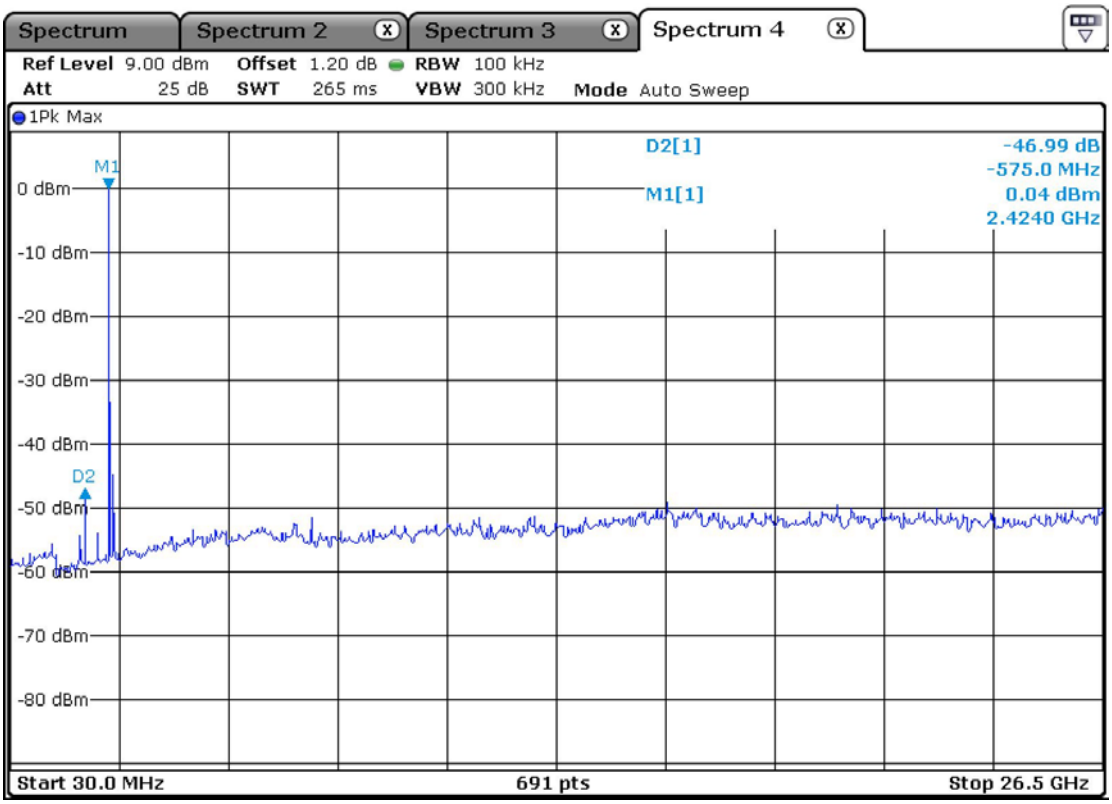
Unwanted Emission – Low Channel

Frequency Range = 30 MHz ~ 26.5 GHz



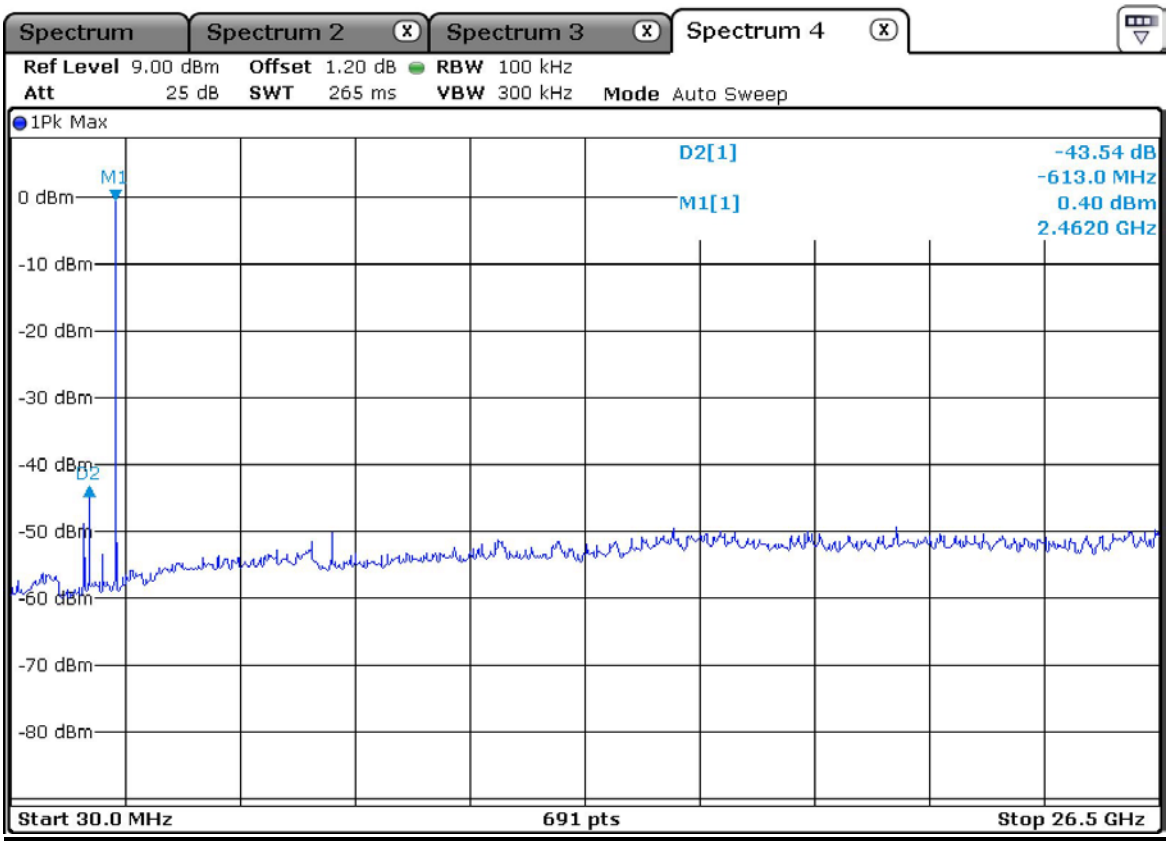
Unwanted Emission – Middle Channel

Frequency Range = 30 MHz ~ 26.5 GHz



Unwanted Emission – High Channel

Frequency Range = 30 MHz ~ 26.5 GHz



3.2.6 Radiated Spurious Emissions

Procedure:

Radiated emissions from 30 MHz to 25 GHz were measured according to the methods defines in ANSI C63.10-2013. The EUT is a placed on as turn table. For emissions testing at or below 1 GHz, the table height shall be 0.8 m above the reference ground plane. For emission measurements above 1 GHz, the table height shall be 1.5 m. 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.

<u>The spectrum analyzer is set to:</u>

Center frequency = the worst channel

Frequency Range = 9 kHz ~ 10th harmonic.

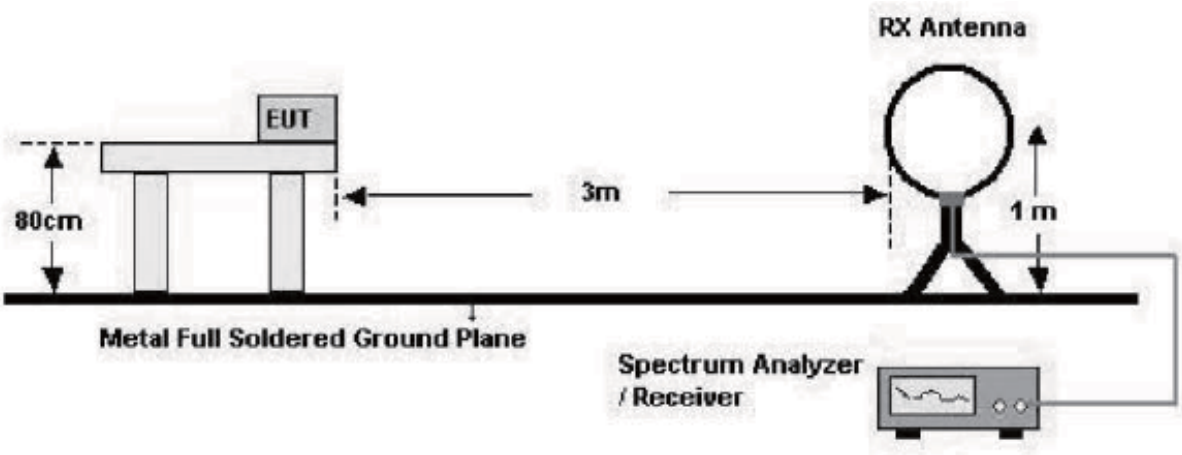
PK

RBW = 100 kHz (30 MHz ~ 1 GHz)	VBW ≥ RBW
= 1 MHz (1 GHz ~ 10th harmonic)	
Span = 100 MHz	Detector function = peak
Trace = max hold	Sweep = auto

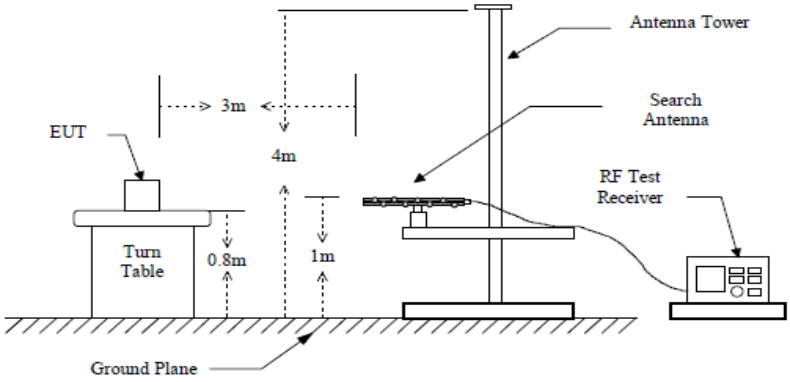
AV

RBW = 1 MHz	VBW = 3MHz
Trace = 100	Detector function = RMS

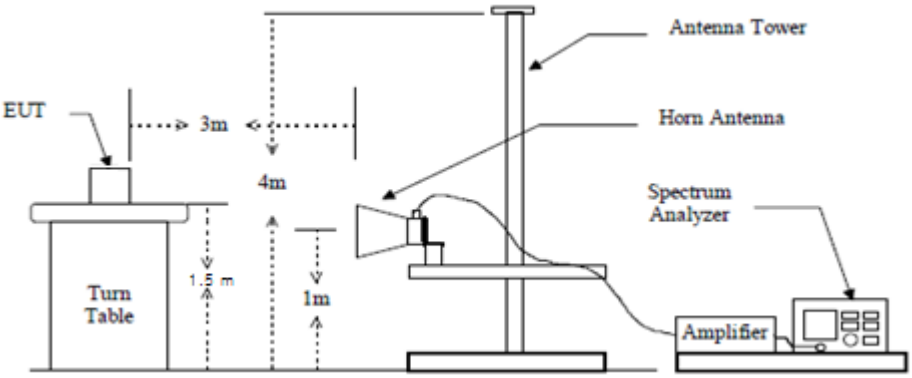
below 30 MHz



below 1 GHz (30 MHz to 1 GHz)



above 1 GHz



Measurement Data: Complies

- See next pages for actual measured data.
- No other emissions were detected at a level greater than 20 dB below limit include from 9 kHz to 30MHz.

- The carrier level (or, noise levels) was (or were) measured at each position of all three axes X, Y and Z, and the position that has the maximum noise was determined.

  Noise levels of all the frequencies were measured at the position.

  * The result is rounded off to the second decimal place, so some differences might be observed.

  * This is the measured data from the worst axis, Y Axis.

Minimum Standard: FCC Part 15.209(a)

Frequency (MHz)	Limit (uV/m) @ 3 m
0.009 ~ 0.490	2400/F(kHz) **(@ 300 m)**
0.490 ~ 1.705	24000/F(kHz) **(@ 30 m)**
1.705 ~ 30	30**(@ 30 m)**
30 ~ 88	100 **
88 ~ 216	150 **
216 ~ 960	200 **
Above 960	500

** Except as provided in 15.209(g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g. 15.231 and 15.241.

Measurement Data : (Above 1 GHz)

Frequency [MHz]	Reading [dBuV/m] AV	Reading [dBuV/m] Peak	Pol.	Correction Factor Antenna-Amp.Gain+Cable	Limits [dBuV/m] AV	Limits [dBuV/m] Peak	Result [dBuV/m] AV	Result [dBuV/m] Peak	Margin [dB] AV	Margin [dB] Peak
15709.00	29.42	42.42	H	8.60	54	74	38.02	51.02	15.98	22.98
17587.00	20.44	30.30	H	14.32	54	74	34.76	49.67	19.24	24.33
17852.00	20.43	35.41	H	14.96	54	74	32.57	44.50	21.43	29.49

- No other emissions were detected at a level greater than 20 dB below limit.

Measurement Data : (9 kHz – 30 MHz)

Frequency [MHz]	Reading [dBuV/m] AV	Reading [dBuV/m] Peak	Pol.	Correction Factor Antenna	Correction Factor Amp.Gain+Cable	Limits [dBuV/m] AV	Limits [dBuV/m] Peak	Result [dBuV/m] AV	Result [dBuV/m] Peak	Margin [dB] AV	Margin [dB] Peak
-	-	-	-	-	-	-	-	-	-	-	-
No emissions were detected at a level greater than 20 dB below limit.											
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-

- No other emissions were detected at a level greater than 20 dB below limit.

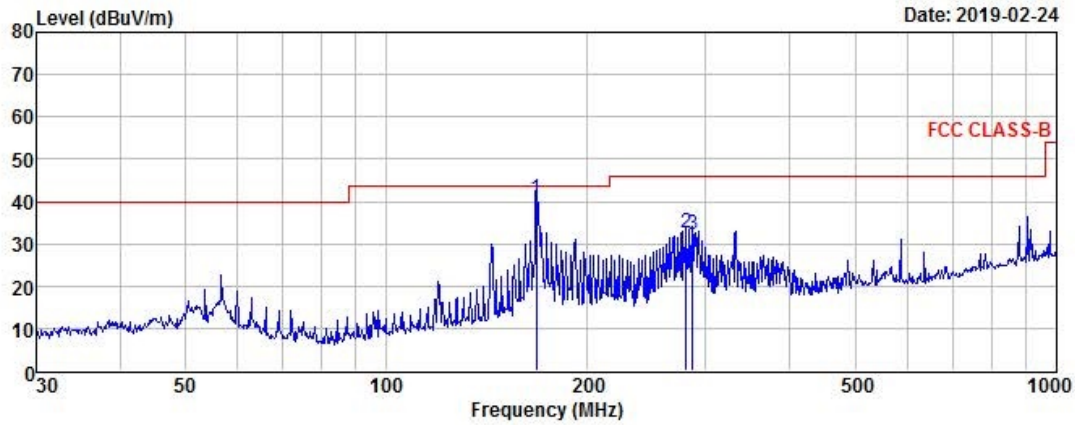
Radiated Emissions (Below 1 GHz) – Operating mode

LTA
Laboratory for Test & Approval Co.,Ltd.
4, Songjuro 236Beon-gil, yanggi-myeon,
Yongin-si, Gyeonggi-do, Korea
Tel : +82-31-3236008,9
Fax : +82-31-3236010
www.ltalab.com

EUT/Model No.: Touch xWallet Temp/Humi: 20 / 31

Test Mode : Operating mode Tested by: Kwon H C

Data: 1868 File: C:\Program Files (x86)\e3\1902-2.EM6 (1877)



Freq MHz	Reading dBuV	C.F dB	Result QP dBuV/m	Limit dBuV/m	Margin dB	Height cm	Angle deg	Polarity
167.82	53.25	-12.76	40.49	43.50	3.01	347	157	HORIZONTAL
281.01	43.85	-11.24	32.61	46.00	13.39	348	122	HORIZONTAL
286.98	43.19	-11.01	32.18	46.00	13.82	341	139	HORIZONTAL

Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain

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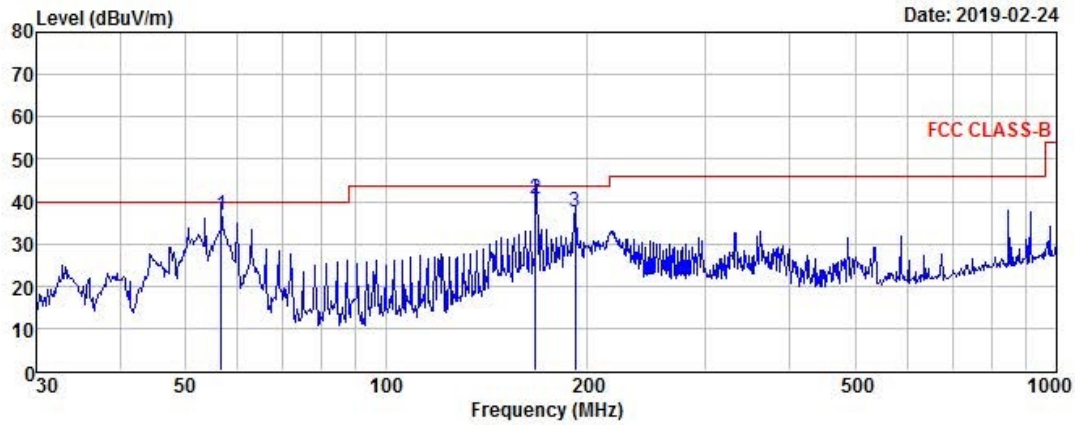
4, Songjuro 236Beon-gil, yanggi-myeon,
Yongin-si, Gyeonggi-do, Korea
Tel : +82-31-3236008,9
Fax : +82-31-3236010
www.ltalab.com

EUT/Model No.: Touch xWallet Temp/Humi: 20 / 31

Test Mode : Operating mode Tested by: Kwon H C

Data: 1869 File: C:\Program Files (x86)\e3\1902-2.EM6 (1877)



Freq	Reading	C.F	Result QP	Limit	Margin	Height	Angle	Polarity
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	deg	
56.79	51.79	-14.96	36.83	40.00	3.17	103	57	VERTICAL
167.24	53.10	-12.70	40.40	43.50	3.10	123	287	VERTICAL
191.75	52.29	-14.81	37.48	43.50	6.02	105	274	VERTICAL

Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain

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Radiated Emissions (Above 1 GHz) – Bluetooth(LOW) mode

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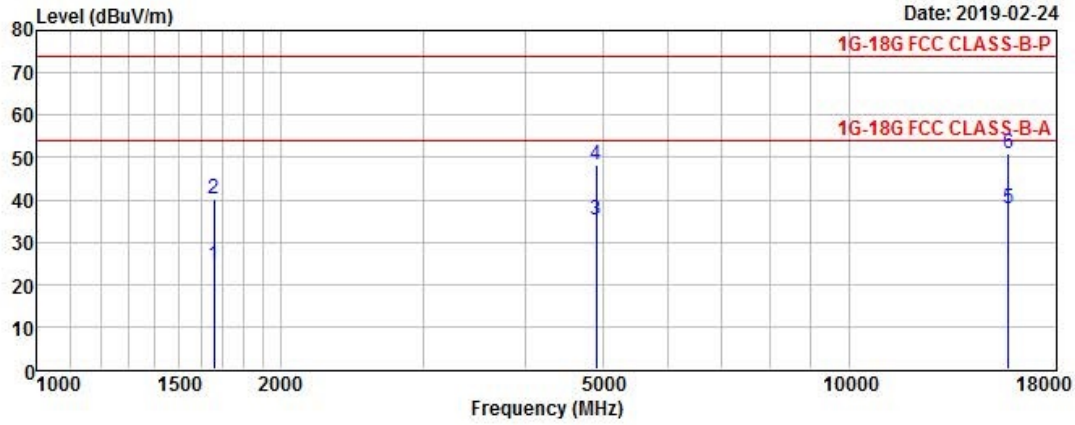
Yongin-si, Gyeonggi-do, Korea
Tel : +82-31-3236008,9
Fax : +82-31-3236010
www.ltalab.com

EUT/Model No.: Touch xWallet Temp/Humi: 20 / 31

Test Mode : Operating mode(LOW) Tested by: Kwon H C

Data: 1878 File: C:\Program Files (x86)\e3\1902-2.EM6 (1883)



Freq MHz	Reading dBuV	C.F dB	Result QP dBuV/m	Limit dBuV/m	Margin dB	Height cm	Angle deg	Polarity
1657.00	36.43	-11.91	24.52	54.00	29.48	341	152	HORIZONTAL
1657.00	51.91	-11.91	40.00	74.00	34.00	341	152	HORIZONTAL
4899.00	37.31	-2.09	35.22	54.00	18.78	243	267	HORIZONTAL
4899.00	50.31	-2.09	48.22	74.00	25.78	243	267	HORIZONTAL
15709.00	29.42	8.60	38.02	54.00	15.98	374	94	HORIZONTAL
15709.00	42.42	8.60	51.02	74.00	22.98	374	94	HORIZONTAL

Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain

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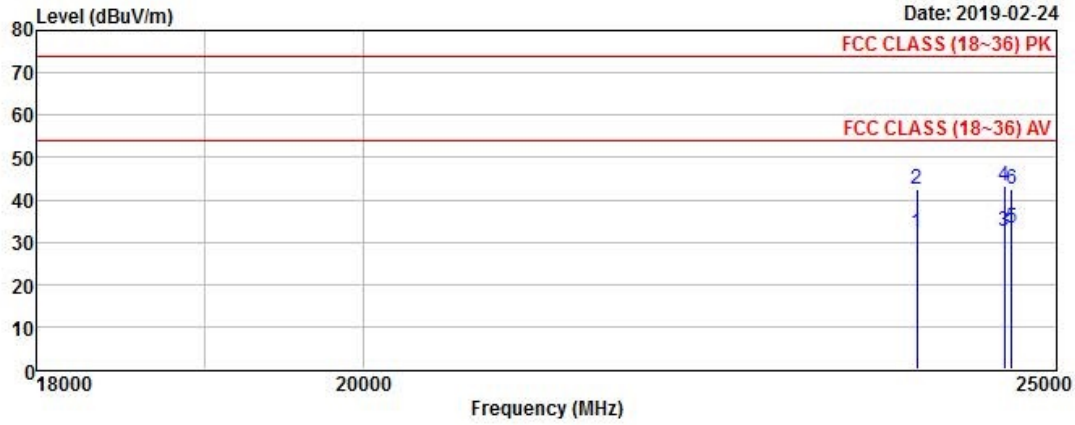
4, Songjuro 236Beon-gil, yanggi-myeon,
Yongin-si, Gyeonggi-do, Korea
Tel : +82-31-3236008,9
Fax : +82-31-3236010
www.ltalab.com

EUT/Model No.: Touch xWallet Temp/Humi: 20 / 31

Test Mode : Operating mode(LOW) Tested by: Kwon H C

Data: 1883 File: C:\Program Files (x86)\e3\1902-2.EM6 (1883)



Freq MHz	Reading dBuV	C.F dB	Result QP dBuV/m	Limit dBuV/m	Margin dB	Height cm	Angle deg	Polarity
23899.00	24.87	7.17	32.04	54.00	21.96	224	207	HORIZONTAL
23899.00	35.31	7.17	42.48	74.00	31.52	224	207	HORIZONTAL
24585.00	25.54	7.14	32.68	54.00	21.32	351	167	HORIZONTAL
24585.00	35.94	7.14	43.08	74.00	30.92	351	167	HORIZONTAL
24639.00	26.31	7.14	33.45	54.00	20.55	364	192	HORIZONTAL
24639.00	35.51	7.14	42.65	74.00	31.35	364	192	HORIZONTAL

Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain

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Bluetooth(MID) mode

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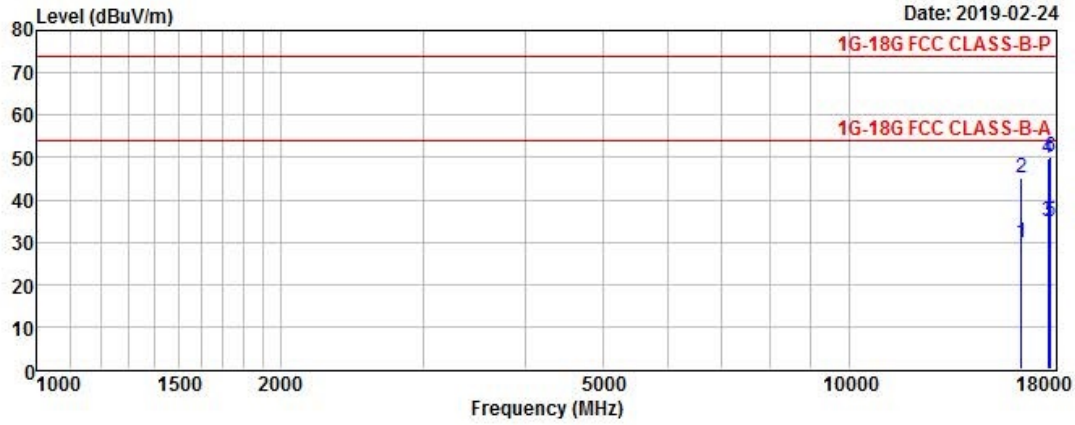
Tel : +82-31-3236008,9
Fax : +82-31-3236010
www.ltalab.com

EUT/Model No.: Touch xWallet Temp/Humi: 20 / 31

Test Mode : Operating mode(MID) Tested by: Kwon H C

Data: 1879 File: C:\Program Files (x86)\e3\1902-2.EM6 (1883)



Freq MHz	Reading dBuV	C.F dB	Result QP dBuV/m	Limit dBuV/m	Margin dB	Height cm	Angle deg	Polarity
16274.00	20.31	9.67	29.98	54.00	24.02	247	223	HORIZONTAL
16274.00	35.61	9.67	45.28	74.00	28.72	247	223	HORIZONTAL
17587.00	20.44	14.32	34.76	54.00	19.24	174	201	HORIZONTAL
17587.00	35.35	14.32	49.67	74.00	24.33	174	201	HORIZONTAL
17681.00	20.12	14.55	34.67	54.00	19.33	154	220	HORIZONTAL
17681.00	35.47	14.55	50.02	74.00	23.98	154	220	HORIZONTAL

Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain

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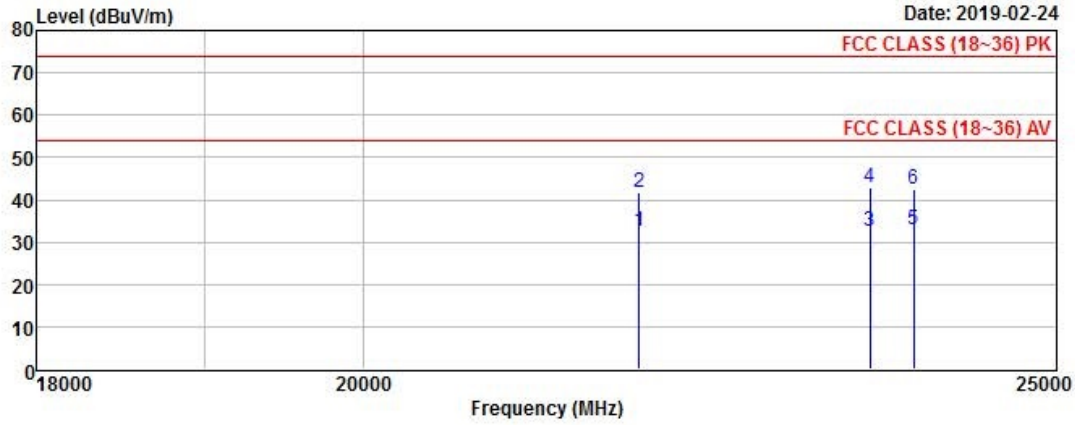
Yongin-si, Gyeonggi-do, Korea
Tel : +82-31-3236008,9
Fax : +82-31-3236010
www.ltalab.com

EUT/Model No.: Touch xWallet Temp/Humi: 20 / 31

Test Mode : Operating mode(MID) Tested by: Kwon H C

Data: 1882 File: C:\Program Files (x86)\e3\1902-2.EM6 (1883)



Freq MHz	Reading dBuV	C.F dB	Result QP dBuV/m	Limit dBuV/m	Margin dB	Height cm	Angle deg	Polarity
21862.00	25.59	6.77	32.36	54.00	21.64	297	38	HORIZONTAL
21862.00	35.09	6.77	41.86	74.00	32.14	297	38	HORIZONTAL
23541.00	25.64	7.06	32.70	54.00	21.30	223	163	HORIZONTAL
23541.00	35.87	7.06	42.93	74.00	31.07	223	163	HORIZONTAL
23876.00	25.74	7.16	32.90	54.00	21.10	176	268	HORIZONTAL
23876.00	35.43	7.16	42.59	74.00	31.41	176	268	HORIZONTAL

Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain

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Bluetooth(HIGH) mode

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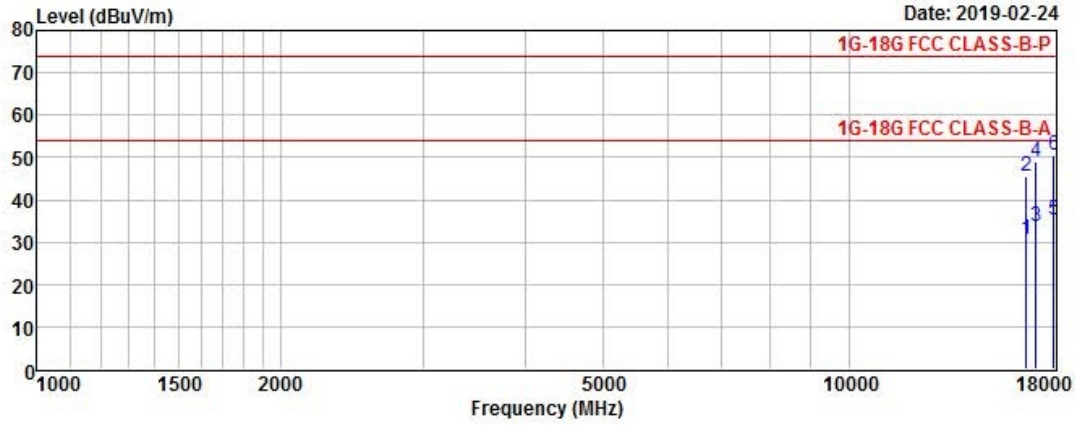
4, Songjuro 236Beon-gil, yanggi-myeon,
Yongin-si, Gyeonggi-do, Korea
Tel : +82-31-3236008,9
Fax : +82-31-3236010
www.ltalab.com

EUT/Model No.: Touch xWallet Temp/Humi: 20 / 31

Test Mode : Operating mode(HIGH) Tested by: Kwon H C

Data: 1880 File: C:\Program Files (x86)\e3\1902-2.EM6 (1883)



Freq MHz	Reading dBuV	C.F dB	Result QP dBuV/m	Limit dBuV/m	Margin dB	Height cm	Angle deg	Polarity
16518.00	20.14	10.35	30.49	54.00	23.51	143	261	HORIZONTAL
16518.00	35.05	10.35	45.40	74.00	28.60	143	261	HORIZONTAL
16965.00	20.47	13.12	33.59	54.00	20.41	274	41	HORIZONTAL
16965.00	35.79	13.12	48.91	74.00	25.09	274	41	HORIZONTAL
17852.00	20.43	14.96	35.39	54.00	18.61	357	321	HORIZONTAL
17852.00	35.41	14.96	50.37	74.00	23.63	357	321	HORIZONTAL

Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain

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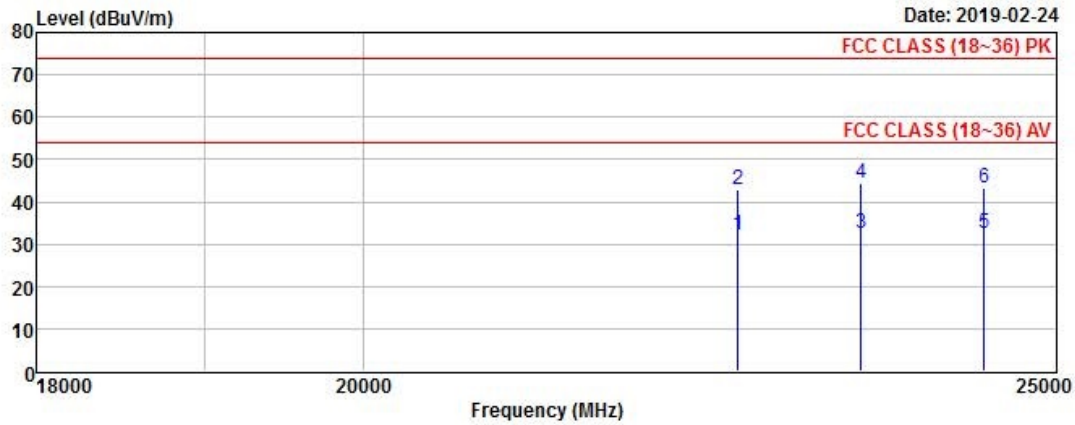
4, Songjuro 236Beon-gil, yanggi-myeon,
Yongin-si, Gyeonggi-do, Korea
Tel : +82-31-3236008,9
Fax : +82-31-3236010
www.ltalab.com

EUT/Model No.: Touch xWallet Temp/Humi: 20 / 31

Test Mode : Operating mode(HIGH) Tested by: Kwon H C

Data: 1881 File: C:\Program Files (x86)\e3\1902-2.EM6 (1883)



Freq	Reading	C.F	Result QP	Limit	Margin	Height	Angle	Polarity
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	deg	
22571.00	25.37	6.86	32.23	54.00	21.77	331	320	HORIZONTAL
22571.00	35.87	6.86	42.73	74.00	31.27	331	320	HORIZONTAL
23471.00	25.53	7.04	32.57	54.00	21.43	301	185	HORIZONTAL
23471.00	37.47	7.04	44.51	74.00	29.49	301	185	HORIZONTAL
24425.00	25.37	7.16	32.53	54.00	21.47	137	238	HORIZONTAL
24425.00	36.13	7.16	43.29	74.00	30.71	137	238	HORIZONTAL

Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain

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3.2.7 AC Conducted Emissions

Procedure:

The conducted emissions are measured in the shielded room with a spectrum analyzer in peak hold. While the measurement, EUT had its hopping function disabled at the middle channels in line with Section 15.31(m). Emissions closest to the limit are measured in the quasi-peak mode (QP) with the tuned receiver using a bandwidth of 9 kHz. The emissions are maximized further by cable manipulation and Exerciser operation. The highest emissions relative to the limit are listed.

Minimum Standard: FCC Part 15.207(a) / EN 55022

Measurement Data: Complies

Class B

Frequency Range	quasi-peak	Average
0.15 ~ 0.5	66 to 56 *	56 to 46 *
0.5 ~ 5	56	46
5 ~ 30	60	50

* Decreases with the logarithm of the frequency

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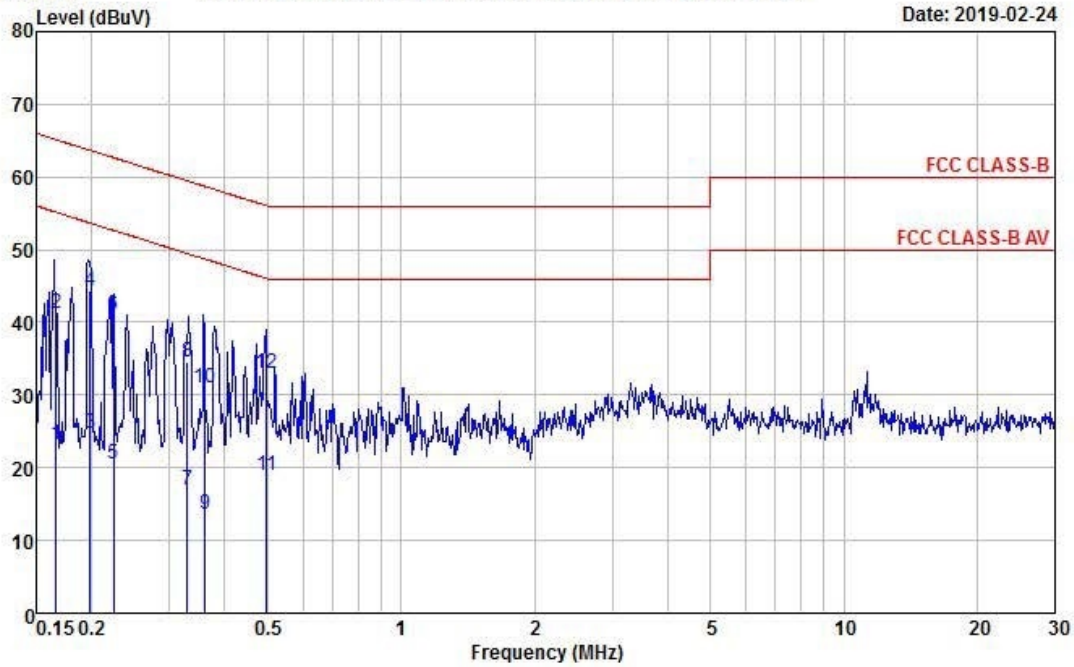
LTA
Laboratory for Test & Approval Co.,Ltd.

4, Songjuro 236 Beon-gil, Yangji-myeon
Cheoin-gu, Youngin-si, Gyeonggi-do
449-822 Korea
Tel:+82-31-3236008,9
Fax:+82-31-3236010

EUT / Model No.	: Touch xWallet	Phase	: LINE
Test Mode	: Charging+BT mode	Test Power	: 120 / 60
Temp. / Humi.	: 22 / 39	Test Engineer	: KWON H C

Data: 731 File: D:\Conducted Data\2019\LTA_Conduction_2019_2.EM6 (2714)



Freq MHz	RD QP dBuV	RD AV dBuV	C.F dB	Result QP dBuV	Result AV dBuV	Limit QP dBuV	Limit AV dBuV	Margin QP dB	Margin AV dB
0.167	21.84	3.80	19.48	41.32	23.28	65.13	55.13	23.81	31.85
0.198	24.90	5.35	19.47	44.37	24.82	63.69	53.69	19.32	28.87
0.224	21.58	0.91	19.48	41.06	20.39	62.67	52.67	21.61	32.28
0.329	15.01	-2.55	19.49	34.50	16.94	59.48	49.48	24.98	32.54
0.360	11.52	-5.97	19.49	31.01	13.52	58.72	48.72	27.71	35.20
0.497	13.43	-0.63	19.51	32.94	18.88	56.05	46.05	23.11	27.17

Remarks: C.F (Correction Factor) = Insertion loss + Cable loss + Pulse Limiter

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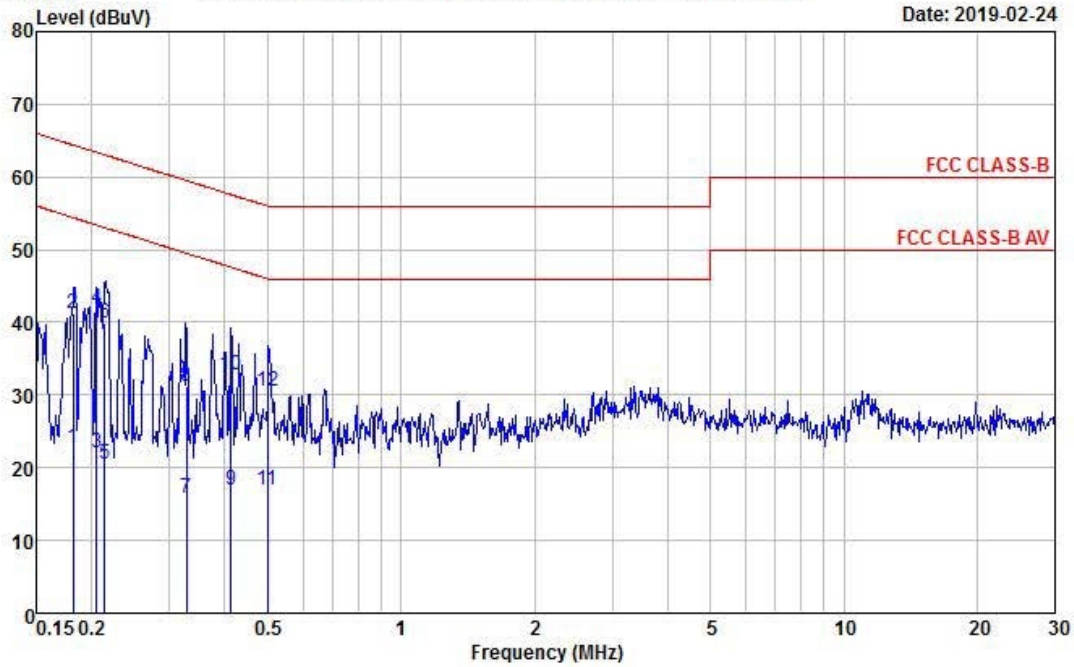
Laboratory for Test & Approval Co.,Ltd.

4, Songjuro 236 Beon-gil, Yangji-myeon
Cheoin-gu, Youngin-si, Gyeonggi-do
449-822 Korea
Tel:+82-31-3236008,9
Fax:+82-31-3236010

EUT / Model No.	: Touch xWallet	Phase	: NEUTRAL
Test Mode	: Charging+BT mode	Test Power	: 120 / 60
Temp. / Humi.	: 22 / 39	Test Engineer	: KWON H C

Data: 734 File: D:\Conducted Data\2019\LTA_Conduction_2019_2.EM6 (2714)



Freq MHz	RD QP dBuV	RD AV dBuV	C.F dB	Result QP dBuV	Result AV dBuV	Limit QP dBuV	Limit AV dBuV	Margin QP dB	Margin AV dB
0.181	21.76	3.32	19.48	41.24	22.80	64.42	54.42	23.18	31.62
0.206	22.48	2.56	19.48	41.96	22.04	63.38	53.38	21.42	31.34
0.214	20.46	1.09	19.48	39.94	20.57	63.05	53.05	23.11	32.48
0.327	11.69	-3.59	19.50	31.19	15.91	59.52	49.52	28.33	33.61
0.413	13.20	-2.48	19.50	32.70	17.02	57.59	47.59	24.89	30.57
0.499	11.09	-2.51	19.51	30.60	17.00	56.01	46.01	25.41	29.01

Remarks: C.F (Correction Factor) = Insertion loss + Cable loss + Pulse Limiter

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APPENDIX

TEST EQUIPMENT USED FOR TESTS

	Use	Description	Model No.	Serial No.	Manufacturer	Interval	Last Cal. Date
1	■	Signal Analyzer (9 kHz ~ 30 GHz)	FSV30	100757	R&S	1 year	2018-09-06
2		SYNTHESIZED CW GENERATOR	83711B	US34490456	HP	1 year	2018-03-19
3		Attenuator (3 dB)	8491A	37822	HP	1 year	2018-09-06
4		Attenuator (10 dB)	8491A	63196	HP	1 year	2018-09-06
5	■	EMI Test Receiver (~7 GHz)	ESCI7	100722	R&S	1 year	2018-09-06
6	■	RF Amplifier (~1.3 GHz)	8447D OPT 010	2944A07684	HP	1 year	2018-09-06
7	■	RF Amplifier (1~26.5 GHz)	8449B	3008A02126	HP	1 year	2018-03-21
8	■	Horn Antenna (1~18 GHz)	3115	00114105	ETS	2 year	2018-08-04
9		DRG Horn (Small)	3116B	81109	ETS-Lindgren	2 year	2018-05-03
10	■	DRG Horn (Small)	3116B	133350	ETS-Lindgren	2 year	2018-05-03
11	■	TRILOG Antenna	VULB 9160	9160-3237	SCHWARZBECK	2 year	2017-04-17
13		DC Power Supply	6674A	3637A01657	Agilent	-	-
14	■	Power Meter	EPM-441A	GB32481702	HP	1 year	2018-03-20
15	■	Power Sensor	8481A	3318A94972	HP	1 year	2018-09-06
16		Audio Analyzer	8903B	3729A18901	HP	1 year	2018-09-06
17		Modulation Analyzer	8901B	3749A05878	HP	1 year	2018-09-06
18		TEMP & HUMIDITY Chamber	YJ-500	LTAS06041	JinYoung Tech	1 year	2018-09-06
19		Stop Watch	HS-3	812Q08R	CASIO	2 year	2018-03-21
20		LISN	KNW-407	8-1430-1	Kyoritsu	1 year	2018-09-06
21		Two-Lime V-Network	ESH3-Z5	893045/017	R&S	1 year	2018-03-20
22		Highpass Filter	WHKX1.5/15G-10SS	74	Wainwright Instruments	1 year	2018-03-20
23		Highpass Filter	WHKX3.0/18G-10SS	118	Wainwright Instruments	1 year	2018-03-20
24		OSP120 BASE UNIT	OSP120	101230	R&S	1 year	2018-03-21
25	■	Signal Generator(100 kHz ~ 40 GHz)	SMB100A	177621	R&S	1 year	2018-03-20
26		Vector Signal Generator(9kHz ~ 6 GHz)	SMBV100A	255081	R&S	1 year	2018-03-20
27		Signal Analyzer (10 Hz ~ 40 GHz)	FSV40	101367	R&S	1 year	2018-03-21
30	■	RF Cable	SUCOFLEX	-	Huber+suhner	-	-

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