Prüfbericht-Nr.: *Test report No.:*	**50058737 001**	**Auftrags-Nr.:** *Order No.:*	164071232	Seite 1 von 29 *Page 1 of 29*
Kunden-Referenz-Nr.: *Client reference No.:*	N/A	**Auftragsdatum:** *Order date.:*	10.08.2016	
Auftraggeber: *Client:*	**Binatone Electronics International Ltd.** Floor 23A, 9 Des Voeux Road West, Sheung Wan, Hong Kong			
Prüfgegenstand: *Test item:*	Digital Video Baby Monitor (Parent Unit)			
Bezeichnung / Typ-Nr.: *Identification / Type No.:*	MBP48PU (motorola)			
Auftrags-Inhalt: *Order content:*	FCC and IC approval			
Prüfgrundlage: *Test specification:*	CFR47 FCC Part 15: Subpart C Section 15.247 CFR47 FCC Part 15: Subpart C Section 15.207 CFR47 FCC Part 15: Subpart C Section 15.209 CFR47 FCC Part 15: Subpart B Section 15.107 CFR47 FCC Part 15: Subpart B Section 15.109 CFR47 FCC Part 2: Section 2.1091		RSS-247 Issue 1 May 2015 RSS-Gen Issue 4 November 2014 ICES-003 Issue 6 January 2016 RSS-102 Issue 5 March 2015	

Wareneingangsdatum: *Date of receipt:*	21.09.2016	Please refer to photo documents
Prüfmuster-Nr.: *Test sample No.:*	A000405259 009-010	
Prüfzeitraum: *Testing period:*	22.09.2016 - 14.10.2016	
Ort der Prüfung: *Place of testing:*	Shenzhen Huatongwei International Insp. Co., Ltd.	
Prüflaboratorium: *Testing laboratory:*	TÜV Rheinland (Shenzhen) Co., Ltd.	
Prüfergebnis*: *Test result*:*	Pass	

geprüft von / *tested by:*

07.12.2016 Ryan Yang / Senior Project Engineer

Datum *Date*	**Name/Stellung** *Name/Position*	**Unterschrift** *Signature*

kontrolliert von / *reviewed by:*

07.12.2016 Winnie Hou / Technical Certifier

Datum *Date*	**Name/Stellung** *Name/Position*	**Unterschrift** *Signature*

Sonstiges / *Other:*

FCC ID: VLJ-MBP48PU
IC: 4522A-MBP48PU HVIN: MBP48PU

Zustand des Prüfgegenstandes bei Anlieferung: Prüfmuster vollständig und unbeschädigt
Condition of the test item at delivery: *Test item complete and undamaged:*

* Legende:	1 = sehr gut	2 = gut	3 = befriedigend	4 = ausreichend	5 = mangelhalt
	P(ass) = entspricht o.g. Prüfgrundlage(n)		F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	N/A = nicht anwendbar	N/T = nicht getestet
Legend:	1 = very good	2 = good	3 = satisfactory	4 = sufficient	5 = poor
	P(ass) = passed a.m. test specifications(s)		F(ail) = failed a.m. test specifications(s)	N/A = not applicable	N/T = not tested

Test Summary

5.1.1 ANTENNA REQUIREMENT
RESULT: Pass

5.1.2 MAXIMUM PEAK CONDUCTED OUTPUT POWER
RESULT: Pass

5.1.3 99% BANDWIDTH
RESULT: Pass

5.1.4 CONDUCTED SPURIOUS EMISSIONS MEASURED IN 100 KHZ BANDWIDTH
RESULT: Pass

5.1.5 RADIATED SPURIOUS EMISSION
RESULT: Pass

5.1.6 20DB BANDWIDTH
RESULT: Pass

5.1.7 CARRIER FREQUENCY SEPARATION
RESULT: Pass

5.1.8 NUMBER OF HOPPING FREQUENCY
RESULT: Pass

5.1.9 TIME OF OCCUPANCY
RESULT: Pass

5.1.10 CONDUCTED EMISSION ON AC MAINS
RESULT: Pass

5.1.11 RADIATED EMISSION
RESULT: Pass

6.1.1 ELECTROMAGNETIC FIELDS
RESULT: Pass

Contents

1 General Remarks

1.1 Complementary Materials

All attachments are integral parts of this test report. This applies especially to the following appendix:

Appendix A: Test Results of General 2.4GHz wireless of Conducted Testing

Appendix B: Test Results of General 2.4GHz wireless of Radiated Testing

2 Test Sites

2.1 Test Facilities

Shenzhen Huatongwei International Insp. Co., Ltd.

Bldg3, Hongfa Hi-tech Industrial Park, Genyu Road, Shenzhen, China

FCC Registration No.: 317478

Test site Industry Canada No.: 5377B

The tests at the test sites have been conducted under the supervision of a TÜV engineer.

2.2 List of Test and Measurement Instruments

Table 1: List of Test and Measurement Equipment

Shenzhen Huatongwei International Insp. Co., Ltd.

Radio Spectrum Test				
Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Cal. Until**
Spectrum Analyzer	Kysight	N9030A	ATO-67098	18.07.2017
Spurious Emission, 30 MHz - 1GHz				
Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Cal. Until**
EMI Test Receiver	R&S	ESCI	101247	31.10.2016
Rod Ant	R&S	HFH2-Z6	A0805563	03.07.2017
Ultra-Broadband Antenna	SCHWARZBECK	VULB9163	538	07.11.2017
Pre-amplifer	SCHWARZBECK	BBV 9743	9743-0022	31.10.2016
Turntable	Maturo Germany	TT2.0-1T	N/A	N/A
Antenna Mast	Maturo Germany	CAM-4.0-P-12	N/A	N/A
Spurious Emission, Above 1GHz				
Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Cal. Until**
Ultra-Broadband Antenna	SCHWARZBECK	VULB9163	546	07.11.2017
Double-Ridged-Waveguide Horn Antenna	SCHWARZBECK	9120D	1011	07.11.2017
Spectrum Analyzer	R&S	FSP40	100597	31.10.2016
Pre-amplifer	SCHWARZBECK	BBV 9743	9743-0022	31.10.2016
Broadband Preamplifer	SCHWARZBECK	BBV 9718	9718-248	31.10.2016
Turntable	Maturo Germany	TT2.0-1T	N/A	N/A
Antenna Mast	Maturo Germany	CAM-4.0-P-12	N/A	N/A
Conducted Emission on AC Mains				
Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Cal. Until**
EMI Test Receiver	R&S	ESCI	101247	31.10.2016
Artificial Mains	SCHWARZBECK	NNLK 8121	573	31.10.2016
Pulse Limiter	R&S	ESH3-Z2	101488	31.10.2016

2.3 Traceability

All measurement equipment calibrations are traceable to NIM (National Institute of Metrology) or where calibration is performed in other countries, to equivalent nationally recognized standards organizations.

2.4 Calibration

Equipment requiring calibration is calibrated periodically by the manufacturer or according to manufacturer's specifications. Additionally all equipment is verified for proper performance on a regular basics using in house standards or comparisons.

2.5 Measurement Uncertainty

The estimated combined standard uncertainty for radiated emissions and conducted emissions measurements as below table

Item		**Extended Uncertainty**
Conducted Emission		± 3.39 dB
Radiated Emission (30-1000MHz)	Field strength (dBμV/m)	U=4.24dB, k=2, σ=95%
Radiated Emission (above 1000MHz)	Field strength (dBμV/m)	U=5.16dB, k=2, σ=95%
Radio Spectrum		± 0.57 dB

2.6 Location of Original Data

The original copies of all test data taken during actual testing were attached at Appendix A & B of this report and delivered to the applicant. A copy has been retained in the TÜV Rheinland (Shenzhen) file for certification follow-up purposes.

2.7 Status of Facility Used for Testing

The Shenzhen Huatongwei International Insp. Co., Ltd. Test facility located at Bldg3, Hongfa Hi-tech Industrial Park, Genyu Road, Shenzhen, China is listed on the US Federal Communications Commission list of facilities approved to perform measurements.

3 General Product Information

3.1 Product Function and Intended Use

The EUT is a Digital Video Baby Monitor (Parent Unit) device, it supports general 2.4GHz wireless technology.

For details refer to the User Manual, Technical Description and Circuit Diagram.

3.2 Ratings and System Details

Table 2: Technical Specification of EUT

General Information of EUT	Value
Kind of Equipment	Digital Video Baby Monitor (Parent Unit)
Type Designation	MBP48PU
Trade Mark	motorola
FCC ID	VLJ-MBP48PU
IC / HVIN	4522A-MBP48PU / MBP48PU
Operating Temperature Range	5 °C ~ +45 °C
Operating Voltage	DC 5.0V 1000mA input via AC/DC adapter DC 3.7V, LITHIUM-ION POLYMER BATTERY
Testing Voltage	AC 120V, 60Hz
AC/DC Adapter	Model: S006AKU0500100 Input: AC 100-240V~50/60Hz, 200mA Output: DC 5.0V~1000mA
Battery	Model: BF6X DC 3.7V, LITHIUM-ION POLYMER BATTERY
Technical Specification of general 2.4GHz wireless	
Operating Frequency	2405 - 2475 MHz
Type of Modulation	FSK
Channel Number	32 channels
Channel Separation	2.0 / 2.5 / 3.0 MHz
Antenna Type	Integral Antenna
Antenna Gain	0 dBi

Table 3: RF Channel and Frequency of general 2.4GHz wireless

RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)
01	**2405**	12	2428	23	2454
02	2407	13	2430	24	2456
03	2409	14	2433	25	2458.5
04	2411	15	2435	26	2460.5
05	2413	**16**	**2437**	27	2462.5
06	2415	17	2439	28	2467
07	2418	18	2441	29	2469
08	2420	19	2444	30	2471
09	2422	20	2446	31	2473
10	2424	21	2450	**32**	**2475**
11	2426	22	2452	/	/

3.3 Independent Operation Modes

The basic operation modes are:

A. On, General 2.4GHz wireless transmitting
    1. Low channel
    2. Middle channel
    3. High channel

B. On, Transmitting on hopping channel

C. On, General 2.4GHz wireless transmitting with AD/DC adapter

D. On, Charging mode for PU via USB port

E. Off

3.4 Noise Generating and Noise Suppressing Parts

Refer to Circuit Diagram for further details.

3.5 Submitted Documents

- Application Form
- Block Diagram
- FCC/IC Label and Location Info
- Operation Description
- PCB Layout
- Photo Document
- Schematics
- User Manual

4 Test Set-up and Operation Modes

4.1 Principle of Configuration Selection

Radio Spectrum: The equipment under test (EUT) was configured at its highest power output in order to measure its highest possible radiation and conducted level. The test modes were adapted accordingly in reference to the instructions for use.

Emission: The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the instructions for use.

4.2 Test Operation and Test Software

Test operation refers to test setup in chapter 5. All testing were performed according to the procedures in ANSI C63.10: 2013 and ANSI C63.4: 2014.

According to clause 3.1, all tests were performed on model MBP48PU in this report.

4.3 Special Accessories and Auxiliary Equipment

Table 4: List of Accessories and Auxiliary Equipment

Description	Manufacturer	Model	S/N	Rating
Laptop	DELL	Laititude E6420	N/A	N/A
Digital Video Baby Monitor (Baby Unit)	VTech (Dongguan) Telecommunications Ltd.	MBP48BU	N/A	N/A

4.4 Countermeasures to Achieve EMC Compliance

The test sample which has been tested contained the noise suppression parts as described in the Technical Construction File (TCF).

No additional measures were employed to achieve compliance.

4.5 Test Setup Diagram

Diagram of Measurement Configuration for Radiation Test (Below 1GHz)

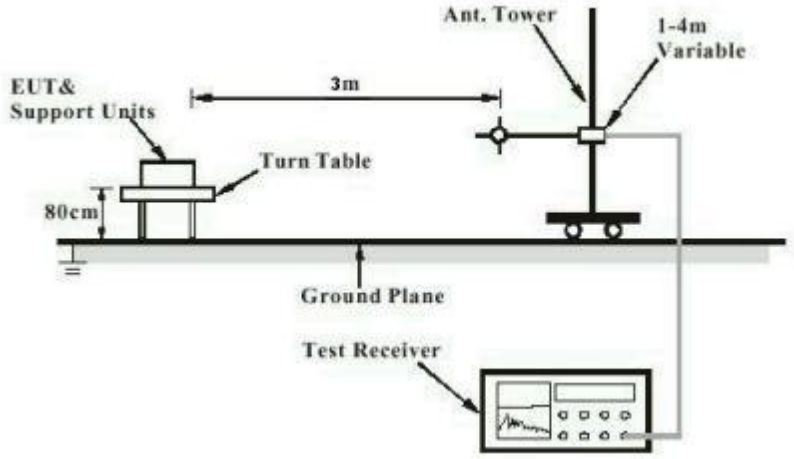


Diagram of Measurement Configuration for Radiation Test (Above 1GHz)

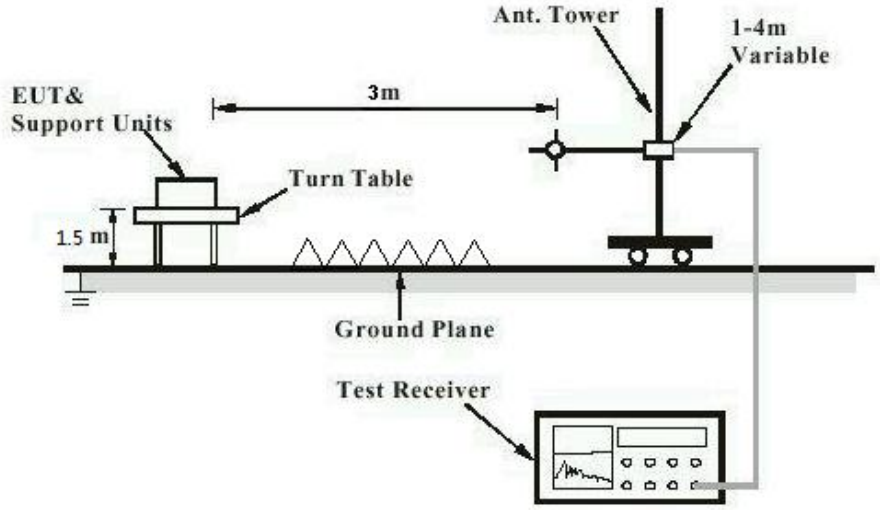


Diagram of Measurement Configuration for Mains Conduction Measurement

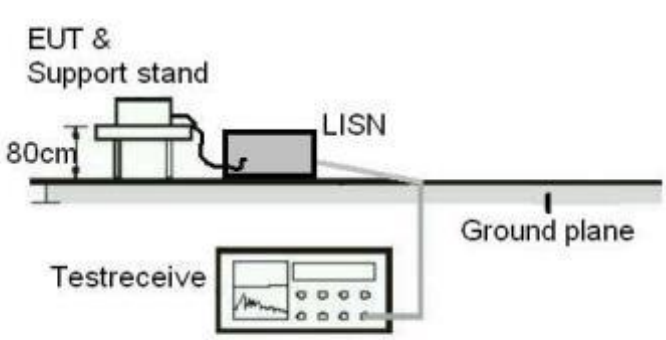
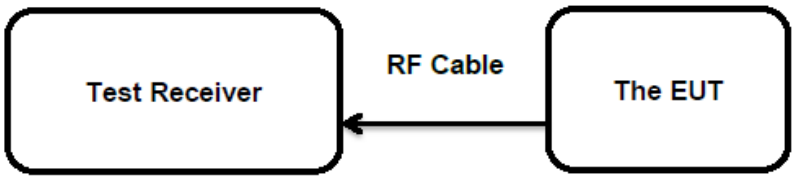


Diagram of Measurement Configuration for Conducted Transmitter Measurement



5 Test Results

5.1 Transmitter Requirement & Test Suites

5.1.1 Antenna Requirement

RESULT: **Pass**

Test Specification

Test standard : FCC Part 15.247(b)(4) and Part 15.203

According to the manufacturer declared, the EUT has an internal antenna, the directional gain of antenna is 0 dBi, and the antenna connector is designed with permanent attachment and no consideration of replacement. Therefore the EUT is considered sufficient to comply with the provision.

Therefore the EUT is considered sufficient to comply with the provision.

Refer to EUT Photo for further details.

5.1.2 Maximum Peak Conducted Output Power

RESULT: **Pass**

Test Specification

Test standard	:	FCC Part 15.247(b)(1)
		RSS-247 Clause 5.4(2)
Basic standard	:	ANSI C63.10: 2013
Limits	:	0.125 Watts
Kind of test site	:	Shielded Room

Test Setup

Date of testing	:	14.10.2016
Input voltage	:	AC 120V, 60Hz
Operation mode	:	A
Test channel	:	Low / Middle / High
Ambient temperature	:	25 ℃
Relative humidity	:	56 %
Atmospheric pressure	:	101 kPa

Table 5: Test Result of Maximum Peak Conducted Output Power

Test EUT	Channel Frequency (MHz)	Measured Peak Output Power		Limit (W)
		(dBm)	(W)	
PU	2405	18.64	0.07311	< 0.125
	2437	18.85	0.07674	
	2475	18.84	0.07656	
Maximum Measured Value		18.85	0.07674	

Note: The cable loss 0.5dB is taken into account in results.

For the measurement records, refer to the appendix A.

5.1.3 99% Bandwidth

RESULT: **Pass**

Test Specification

Test standard	:	RSS-Gen Clause 6.6
Basic standard	:	ANSI C63.10: 2013
Kind of test site	:	Shielded Room

Test Setup

Date of testing	:	14.10.2016
Input voltage	:	AC 120V, 60Hz
Operation mode	:	A
Test channel	:	Low / Middle / High
Ambient temperature	:	25 ℃
Relative humidity	:	56 %
Atmospheric pressure	:	101 kPa

Table 6: Test Result of 99% Bandwidth

Test EUT	Test Channel (MHz)	99% Bandwidth (MHz)	Limit (kHz)
PU	2405	2.259	/
	2437	2.281	
	2475	2.234	
Minimum Measured Value		2.234	

For the measurement records, refer to the appendix A.

5.1.4 Conducted Spurious Emissions Measured in 100 kHz Bandwidth

RESULT: **Pass**

Test Specification

Test standard	:	FCC Part 15.247(d) RSS-247 Clause 5.5
Basic standard	:	ANSI C63.10: 2013
Limits	:	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, must also comply with the radiated emission limits specified in 15.209(a)
Kind of test site	:	Shielded Room

Test Setup

Date of testing	:	14.10.2016
Input voltage	:	AC 120V, 60Hz
Operation mode	:	A
Test channel	:	Low / Middle / High
Ambient temperature	:	25 ℃
Relative humidity	:	56 %
Atmospheric pressure	:	101 kPa

Test results of 100kHz Bandwidth of Frequency Band Edge by Conducted method refer to following test plot, and compliance is achieved as well.

For the measurement records, refer to the appendix A.

5.1.5 Radiated Spurious Emission

RESULT: **Pass**

Test Specification

Test standard	:	FCC Part 15.247(d) & FCC Part 15.205
		RSS-247 Clause 3.3
Basic standard	:	ANSI C63.10: 2013
Limits	:	Refer to 15.209(a) of FCC part 15.247(d)
		RSS-Gen Issue 4 Table 4
Kind of test site	:	3m Semi-anechoic Chamber

Test Setup

Date of testing	:	Refer to test plots
Input voltage	:	AC 120V, 60Hz
Operation mode	:	A
Test channel	:	Low / Middle / High
Ambient temperature	:	25 ℃
Relative humidity	:	56 %
Atmospheric pressure	:	101 kPa

Remark:
Testing was carried out within frequency range 9kHz – 30MHz and 18GHz - 26.5GHz, and the measurements with active antenna were greater than 20dB below the limit, so the test data were not recorded in the test report.

For the measurement records, refer to the appendix B.

5.1.6 20dB Bandwidth

RESULT: **Pass**

Test Specification

Test standard	:	FCC Part 15.247(a)(1)
		RSS-247 Clause 5.1(1)
Basic standard	:	ANSI C63.10: 2013
Kind of test site	:	Shielded Room

Test Setup

Date of testing	:	14.10.2016
Input voltage	:	AC 120V, 60Hz
Operation mode	:	A
Test channel	:	Low / Middle / High
Ambient temperature	:	25 ℃
Relative humidity	:	56 %
Atmospheric pressure	:	101 kPa

Table 7: Test Result of 20dB Bandwidth

Test EUT	Channel Frequency (MHz)	20dB Bandwidth (kHz)	2/3 of 20dB Bandwidth (kHz)	Limit (MHz)
PU	2405	2457.00	1638.000	/
	2437	2455.00	1636.667	
	2475	2416.00	1610.667	
Maximum Measured Value		2457.00	1638.000	/

For the measurement records, refer to the appendix A.

5.1.7 Carrier Frequency Separation

RESULT: **Pass**

Test Specification

Test standard	:	FCC Part 15.247(a)(1)
		RSS-247 Clause 5.1(2)
Basic standard	:	ANSI C63.10: 2013
Limits	:	≥ 25kHz or 2/3 of 20dB bandwidth, whichever is greater
Kind of test site	:	Shielded Room

Test Setup

Date of testing	:	14.10.2016
Input voltage	:	AC 120V, 60Hz
Operation mode	:	B
Test channel	:	Low / Middle / High
Ambient temperature	:	25 ℃
Relative humidity	:	56 %
Atmospheric pressure	:	101 kPa

Table 8: Test Result of Carrier Frequency Separation

Test EUT	Test Channel	Channel Frequency (MHz)	Measured Channel Separation (KHz)	Limit (kHz)
PU	Low Channel	2405	1974.0	≥ 25kHz or 2/3 of 20dB bandwidth
	Adjacency Channel	2407		
	Middle Channel	2437	1992.0	
	Adjacency Channel	2439		
	High Channel	2475	1980.0	
	Adjacency Channel	2473		

Note: The limit is maximum 2/3 of the 20 dB bandwidth: 1638.000 KHz.

For the measurement records, refer to the appendix A.

5.1.8 Number of Hopping Frequency

RESULT: **Pass**

Test Specification

Test standard	:	FCC part 15.247(a)(1)(iii)
		RSS-247 Clause 5.1(4)
Basic standard	:	ANSI C63.10: 2013
Limits	:	≥ 15 non-overlapping channels
Kind of test site	:	Shielded Room

Test Setup

Date of testing	:	14.10.2016
Input voltage	:	AC 120V, 60Hz
Operation mode	:	B
Ambient temperature	:	25 ℃
Relative humidity	:	56 %
Atmospheric pressure	:	101 kPa

Table 9: Test Result of Number of Hopping Frequency

Test EUT	Frequency Range	Measured Quantity of Hopping Channel	Limit
PU	2405 - 2475 MHz	17	≥15

For the measurement records, refer to the appendix A.

5.1.9 Time of Occupancy

RESULT: **Pass**

Test Specification

Test standard	:	FCC part 15.247(a)(1)(iii)
		RSS-247 Clause 5.1(4)
Basic standard	:	ANSI C63.10: 2013
Limits	:	< 0.4s
Kind of test site	:	Shielded Room

Test Setup

Date of testing	:	14.10.2016
Input voltage	:	AC 120V, 60Hz
Operation mode	:	B
Test channel	:	Low / Middle / High
Ambient temperature	:	25 ℃
Relative humidity	:	56 %
Atmospheric pressure	:	101 kPa

Table 10: Test Result of Time of Occupancy

Test EUT	Test Channel (MHz)	Pulse width (ms)	Number of Channels	Measured Dwell time (s)	Limit (s)
PU	2405	0.800	42	0.034	0.4s
	2437	0.800	42	0.034	
	2475	0.800	42	0.034	

Note:

Dwell time = Pulse width x Number of channels in Period

Period = 0.4 (seconds/ channel) x 17 (channel) = 6.8 seconds

For the measurement records, refer to the appendix A.

5.1.10 Conducted Emission on AC Mains

RESULT: **Pass**

Test Specification

Test standard	:	FCC Part 15.207(a) & FCC Part 15.107(a)
		RSS-Gen Clause 8.8 & ICES-003
Basic standard	:	ANSI C63.10: 2013 & ANSI C63.4: 2014
Frequency range	:	0.15 – 30MHz
Limits	:	FCC Part 15.207(a) & FCC Part 15.107(a)
		RSS-Gen Table 3 & ICES-003 Table 2
Kind of test site	:	Shielded Room

Test Setup

Date of testing	:	Refer to test plots
Input voltage	:	AC 120V, 60Hz
Operation mode	:	C, D
Earthing	:	Not connected
Ambient temperature	:	24 ℃
Relative humidity	:	53 %
Atmospheric pressure	:	101 kPa

For the measurement records, refer to the appendix B.

5.1.11 Radiated Emission

RESULT: **Pass**

Test Specification

Test standard	:	FCC Part 15.109(a)
		ICES-003
Basic standard	:	ANSI C63.4: 2014
Frequency range	:	30 - 6000MHz
Classification	:	Class B
Limits	:	FCC Part 15.109(a)
		ICES-003 Table 5 & Table 7
Kind of test site	:	3m Semi-anechoic Chamber

Test Setup

Date of testing	:	Refer to test plots
Input voltage	:	AC 120V, 60Hz
Operation mode	:	D
Earthing	:	Not connected
Ambient temperature	:	24 ℃
Relative humidity	:	48 %
Atmospheric pressure	:	101 kPa

For the measurement records, refer to the appendix B.

6 Safety Human Exposure

6.1 Radio Frequency Exposure Compliance

6.1.1 Electromagnetic Fields

RESULT: **Pass**

Test Specification

Test standard	:	CFR47 FCC Part 2: Section 2.1091
		CFR47 FCC Part 1: Section 1.1310
		FCC KDB Publication 447498 v06
		FCC KDB Publication 865664 D02 v01r02
		OET Bulletin 65 (Edition 97-01)
		RSS-102 Issue 5 March 2015

➢ **FCC requirements**

FCC requirement: Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as a mobile device whereby a distance of 20cm normally can be maintained between the user and the device.

MPE Calculation Method according to OET Bulletin 65

Power Density: $S_{(mW/cm^2)} = PG/4\pi R^2$ or $EIRP/4\pi R^2$

Where:

S = power density (mW/cm^2)

P = power input to the antenna (mW)

G = power gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the center of radiation of the antenna (cm)

The nominal conducted output power specified:

2.4GHz FHSS: 19.00 dBm (Tolerance: ± 2 dB)

From the peak RF output power, the minimum mobile separation distance, d=20 cm, as well as the antenna gain (Max. 0.0 dBi for 2.4GHz FHSS), the RF power density can be calculated as below:

For 2.4GHz FHSS: $\mathbf{S_{(mW/cm^2)} = PG/4\pi R^2 =}$ 0.013 mW/cm^2

Limits for Maximum Permissible Exposure (MPE) according to FCC Part 1.1310:

1.0 mW/cm^2

➢ **IC requirements:** The EUT shall comply with the requirement of RSS-102 section 2.5.2.

Exemption from Routine Evaluation Limits – RF Exposure Evaluation

RF exposure evaluation is required if the separation distance between the user and/or bystander and the device's radiating element is greater than 20 cm, except when the device operates as follows:

at or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $1.31 \times 10^{-2}\ f^{0.6834}$ W (adjusted for tune-up tolerance), where f is in MHz;

- RF exposure evaluation exempted power for 2.4GHz FHSS: 2.679 W

The nominal conducted output power specified:

2.4GHz FHSS: 19.00 dBm (Tolerance: ± 2 dB)

Antenna Gain: 0.0 dBi for 2.4GHz FHSS

The Max. e.i.r.p. for 2.4GHz FHSS = 18.00 dBm ≈ 0.063 W is less than the RF exposure evaluation exempted power. So RF exposure evaluation is not required.

"RF Radiation Exposure Statement Caution: This Transmitter must be installed to provide a separation distance of at least 20 cm from all persons."

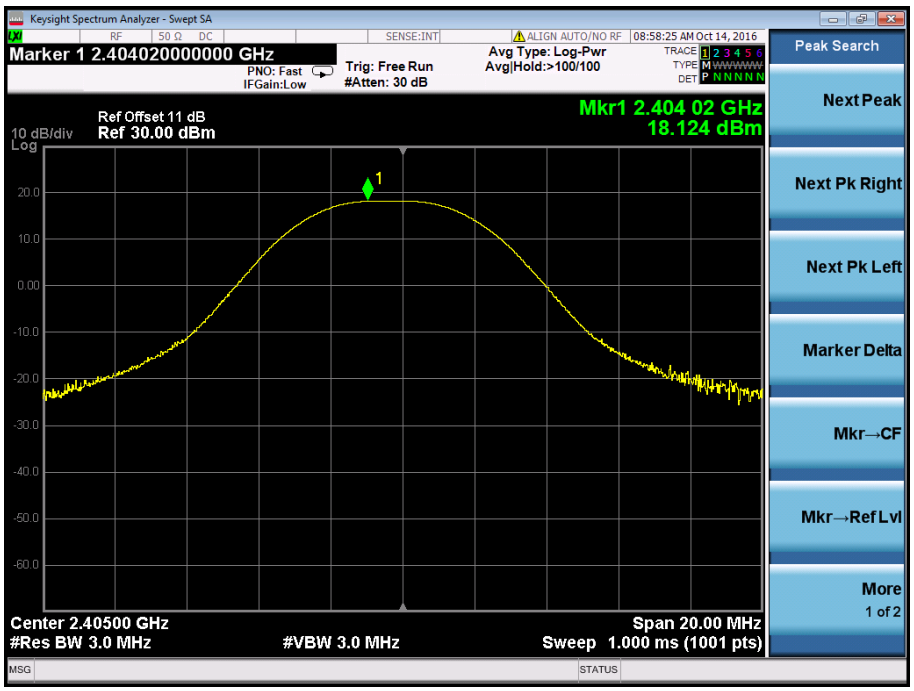
8 List of Tables

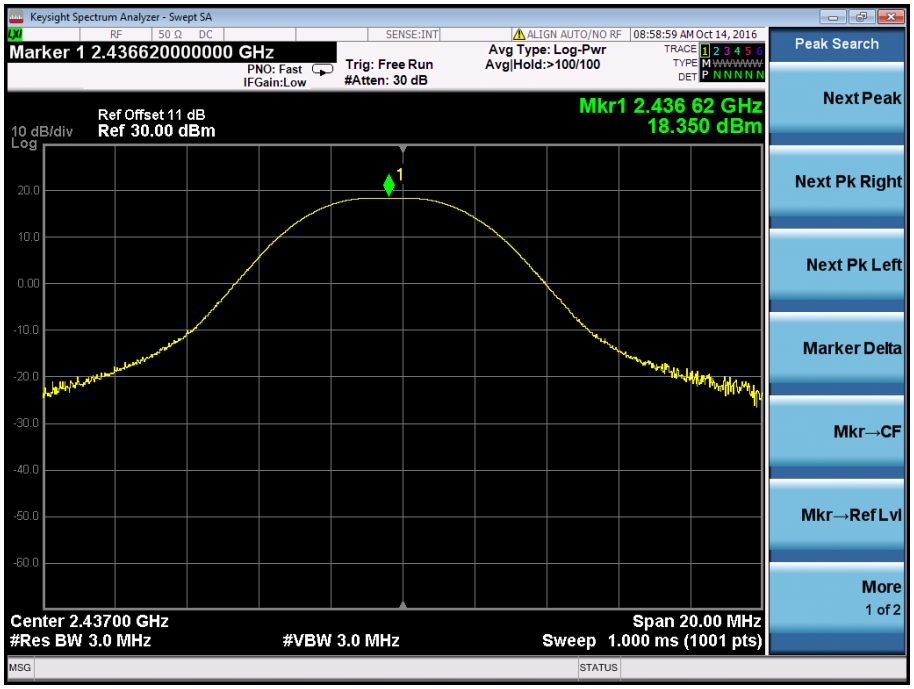
9 List of Photographs

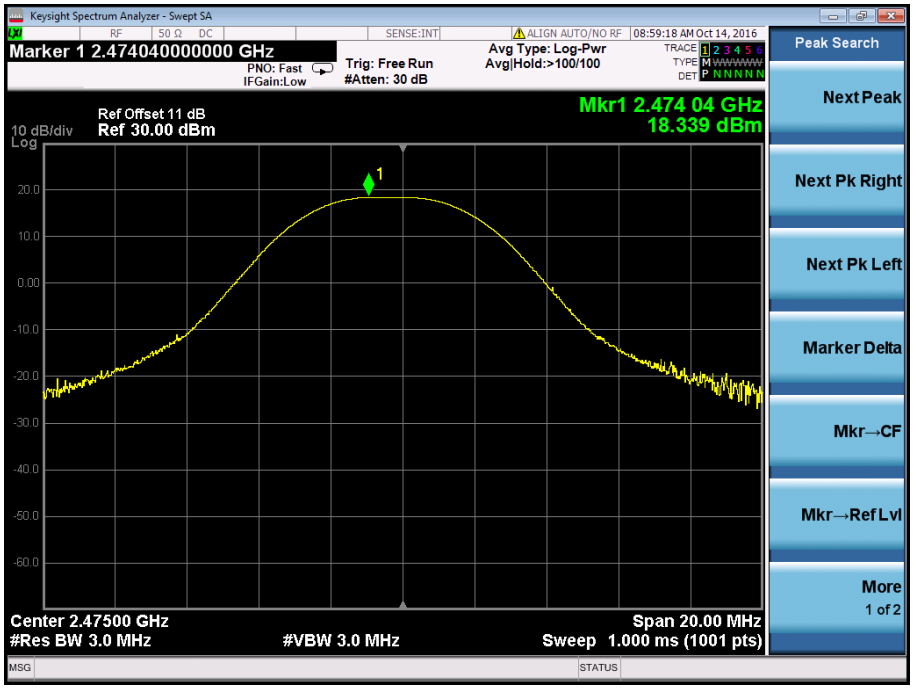
Appendix A

Test Results of General 2.4GHz wireless of Conducted Testing

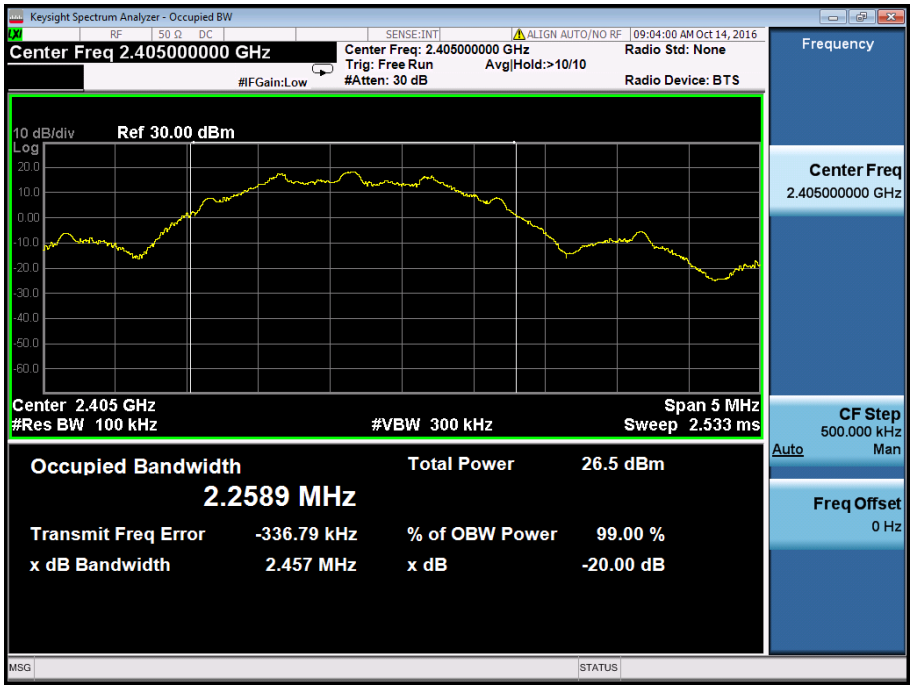
Appendix A.1: Maximum Peak Conducted Output Power

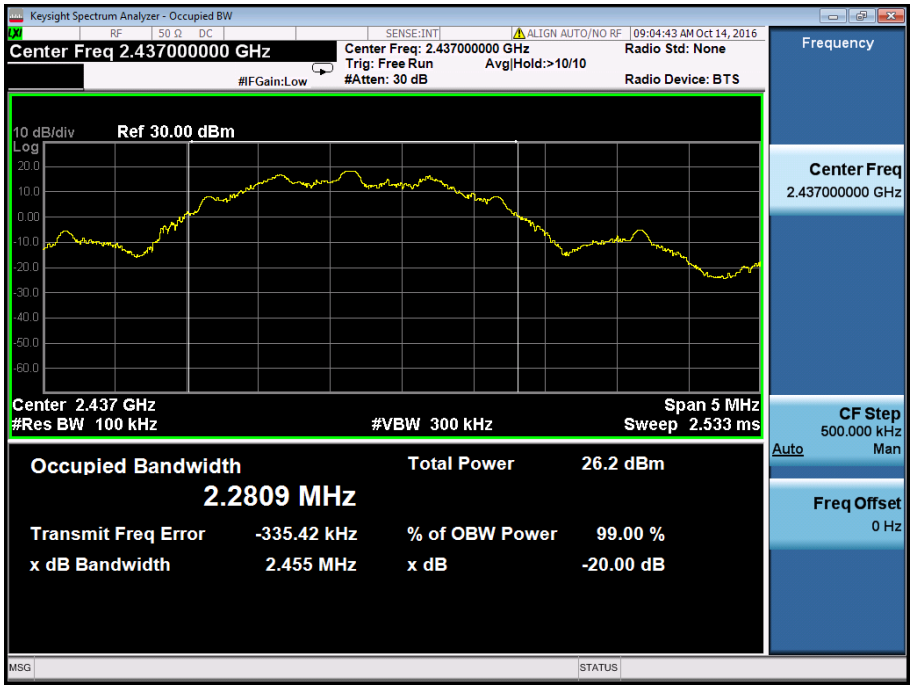


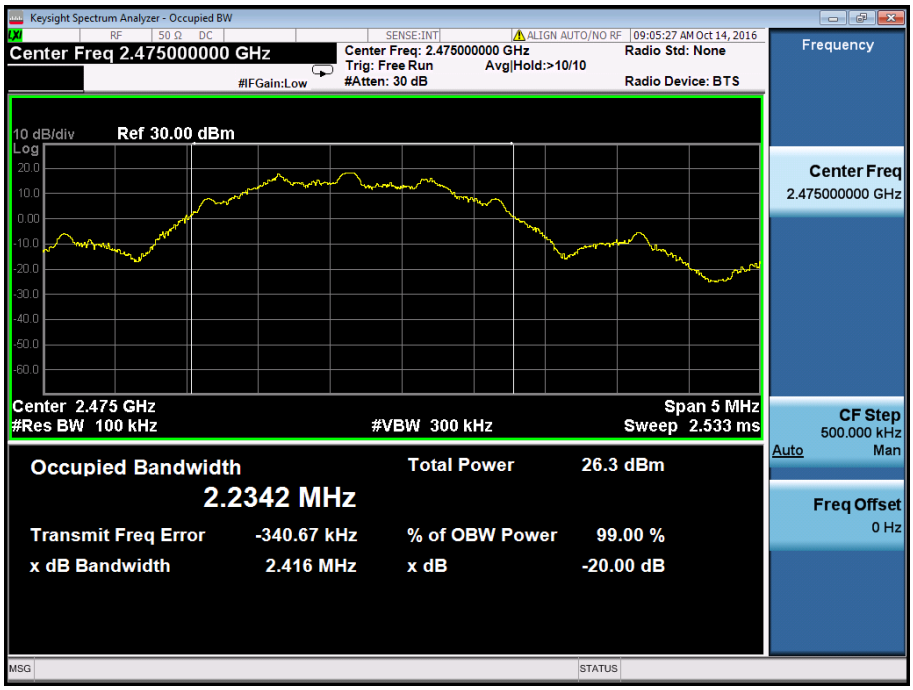




Appendix A.2: 99% Bandwidth & 20dB Bandwidth

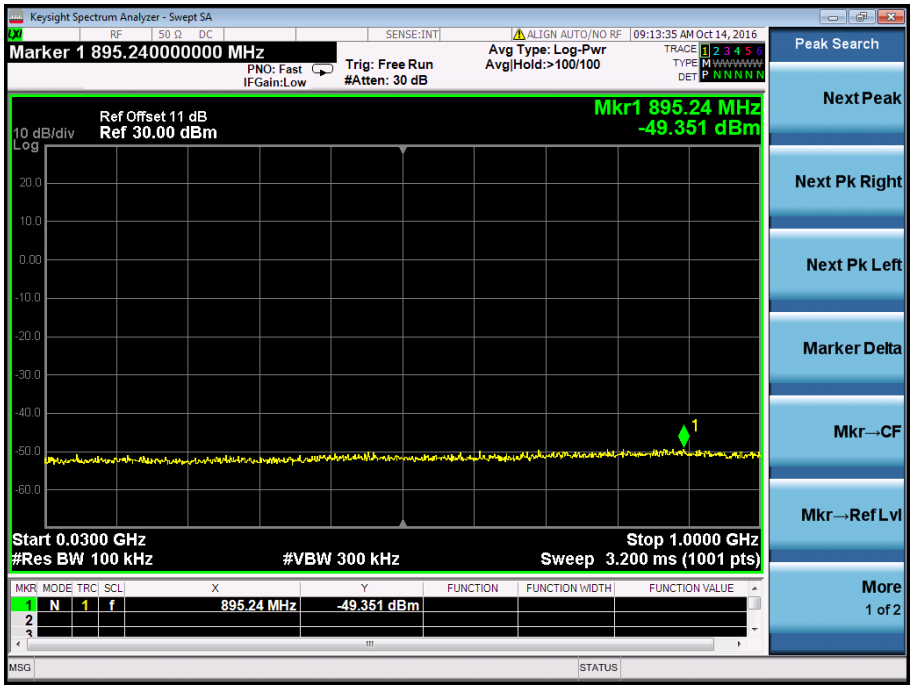


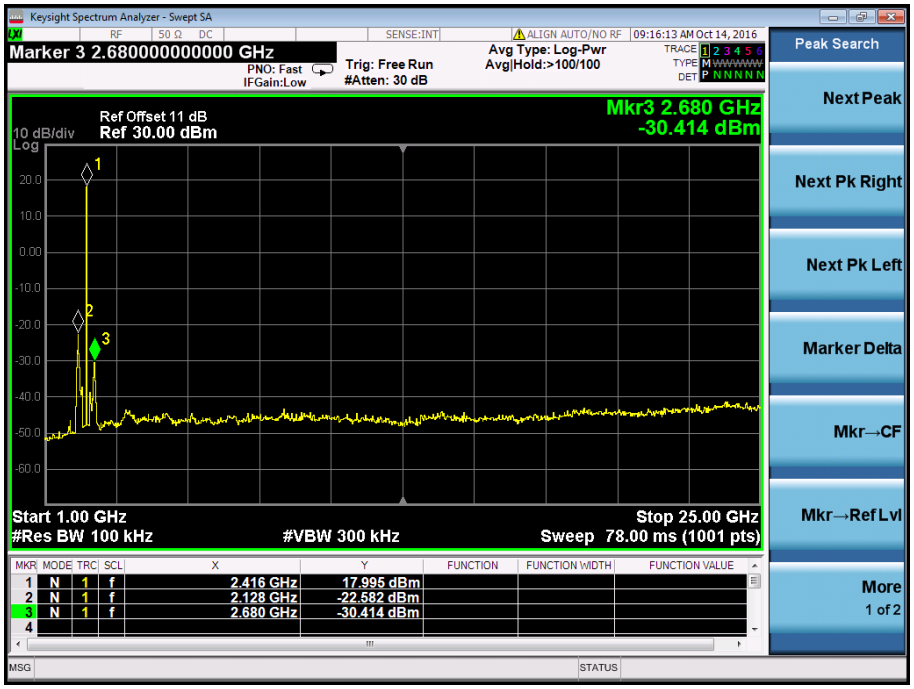

Keysight Spectrum Analyzer - Occupied BW
Center Freq 2.437000000 GHz
Center Freq: 2.437000000 GHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 30 dB
#IFGain:Low
Radio Std: None
Radio Device: BTS
09:04:43 AM Oct 14, 2016
10 dB/div
Log
Ref 30.00 dBm
Center 2.437 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 5 MHz
Sweep 2.533 ms
Occupied Bandwidth
2.2809 MHz
Total Power
26.2 dBm
Transmit Freq Error
-335.42 kHz
% of OBW Power
99.00 %
x dB Bandwidth
2.455 MHz
x dB
-20.00 dB
Frequency
Center Freq
2.437000000 GHz
CF Step
500.000 kHz
Auto
Man
Freq Offset
0 Hz
MSG
STATUS


Keysight Spectrum Analyzer - Occupied BW
Center Freq 2.475000000 GHz
Center Freq: 2.475000000 GHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 30 dB
#IFGain:Low
Radio Std: None
Radio Device: BTS
09:05:27 AM Oct 14, 2016
10 dB/div
Log
Ref 30.00 dBm
Center 2.475 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 5 MHz
Sweep 2.533 ms
Occupied Bandwidth
2.2342 MHz
Total Power
26.3 dBm
Transmit Freq Error
-340.67 kHz
% of OBW Power
99.00 %
x dB Bandwidth
2.416 MHz
x dB
-20.00 dB
Frequency
Center Freq
2.475000000 GHz
CF Step
500.000 kHz
Auto
Man
Freq Offset
0 Hz
MSG
STATUS

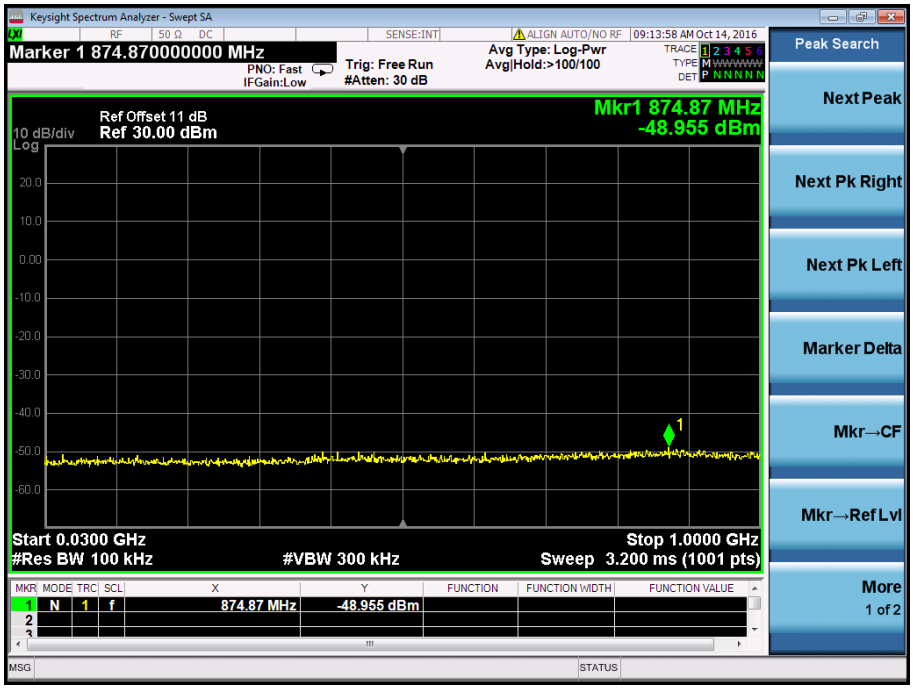
Appendix A.3: Conducted Spurious Emissions Measured in 100 kHz Bandwidth

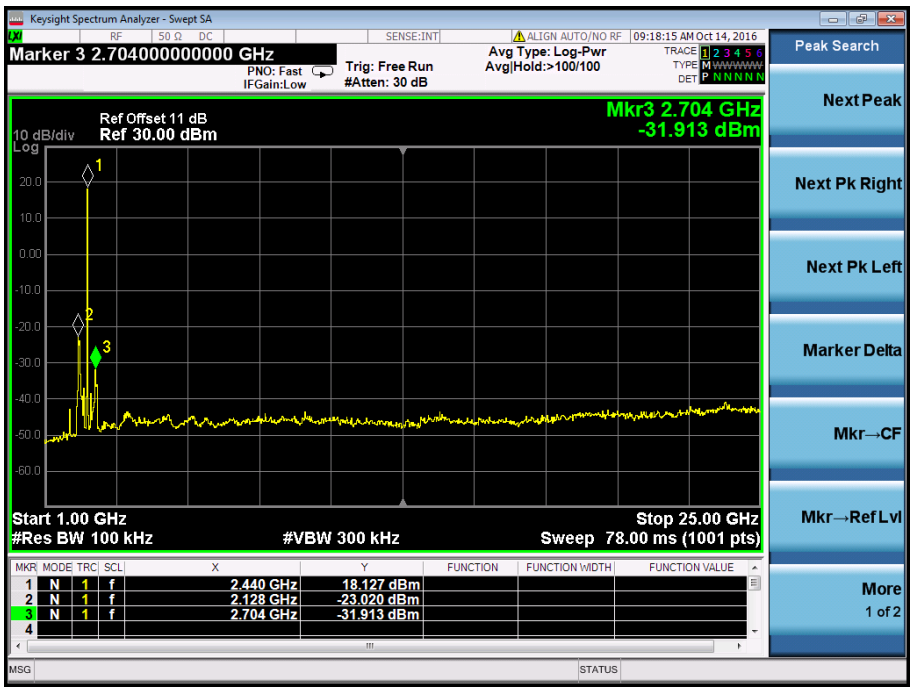
Low Channel



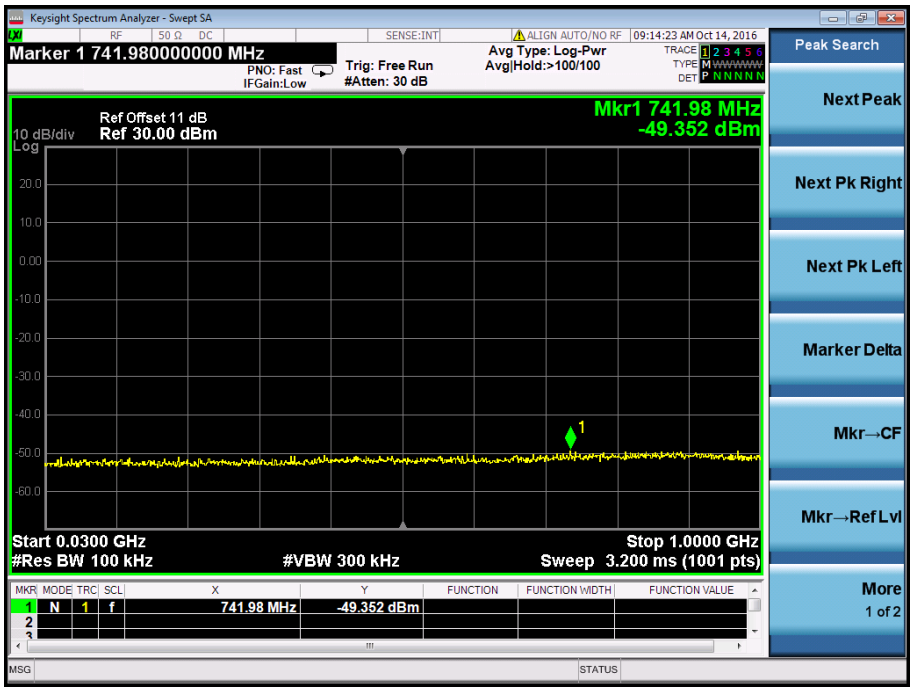


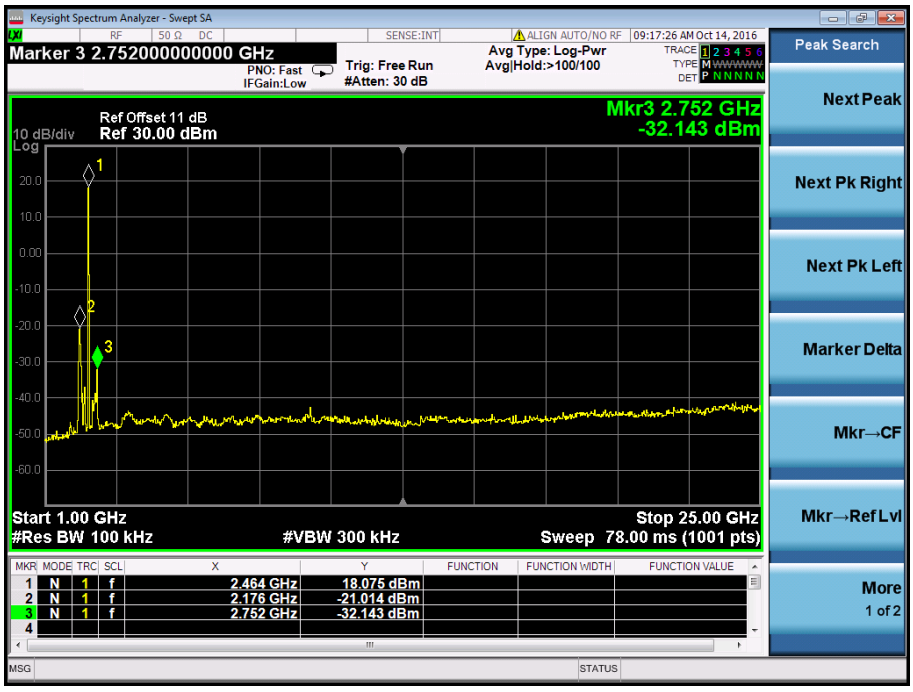
Middle Channel



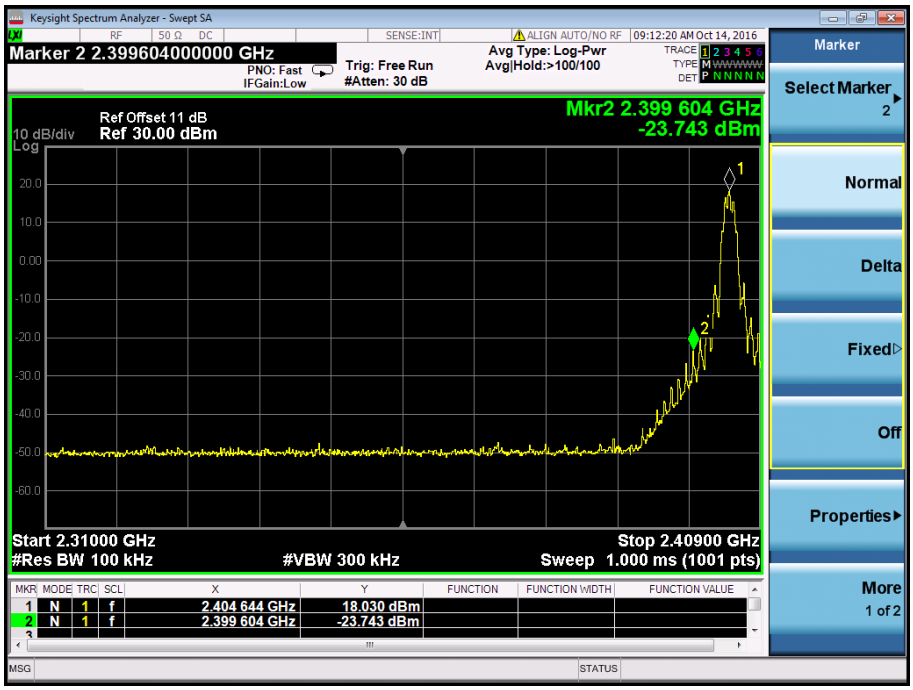


High Channel



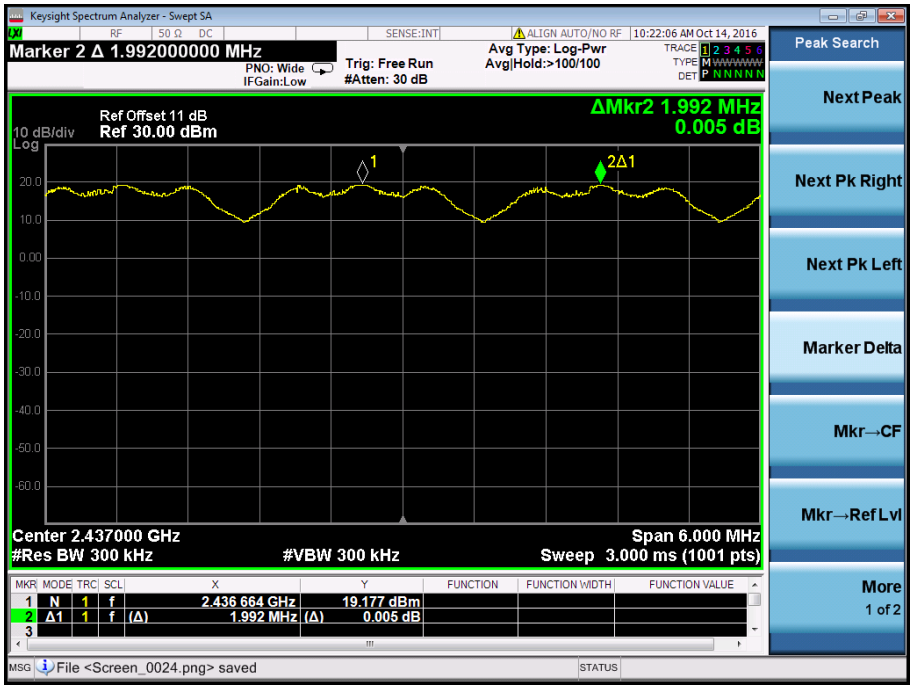


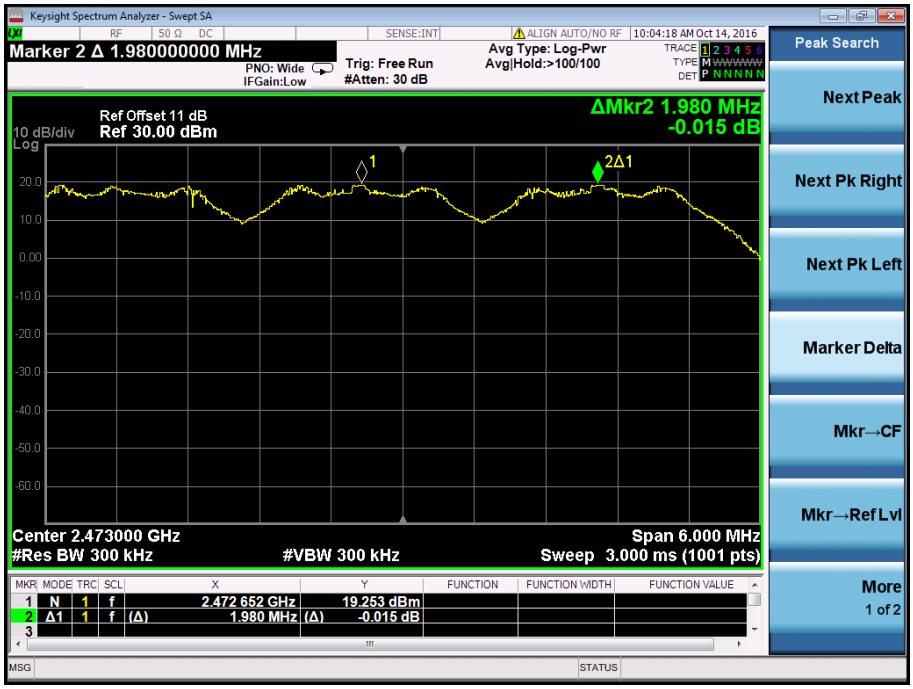
PU, Band Edge


Keysight Spectrum Analyzer - Swept SA
Marker 2 2.399604000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
09:12:20 AM Oct 14, 2016
Ref Offset 11 dB
10 dB/div
Log
Ref 30.00 dBm
Mkr2 2.399 604 GHz
-23.743 dBm
Start 2.31000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.40900 GHz
Sweep 1.000 ms (1001 pts)
1 N 1 f 2.404 644 GHz 18.030 dBm
2 N 1 f 2.399 604 GHz -23.743 dBm
Marker
Select Marker 2
Normal
Delta
Fixed
Off
Properties
More 1 of 2
MSG
STATUS

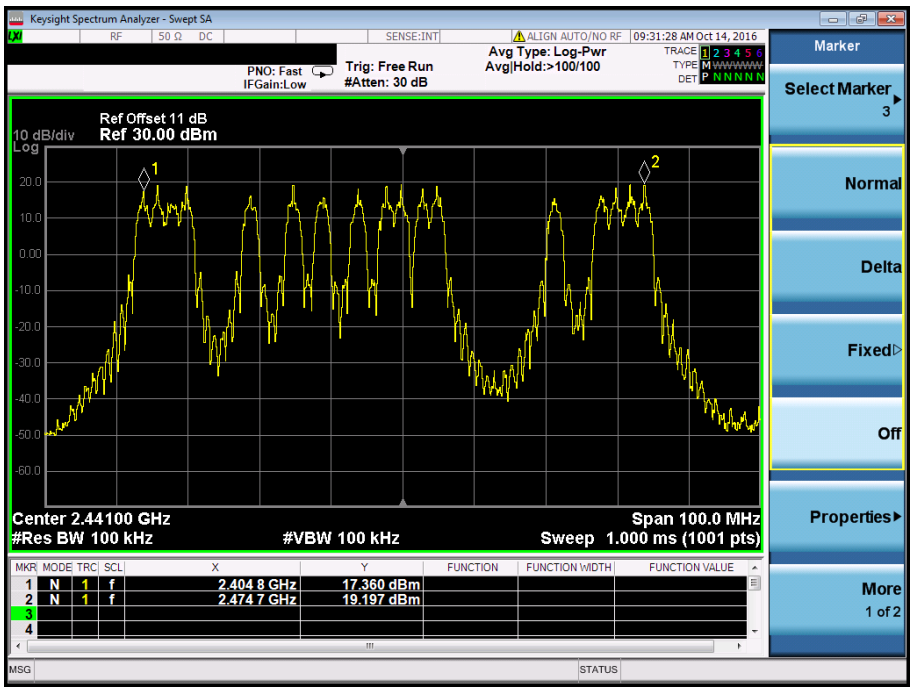

Keysight Spectrum Analyzer - Swept SA
Marker 2 2.483617000000 GHz
PNO: Wide
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
09:09:41 AM Oct 14, 2016
Ref Offset 11 dB
10 dB/div
Log
Ref 30.00 dBm
Mkr2 2.483 617 GHz
-36.014 dBm
Start 2.47100 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.51000 GHz
Sweep 1.000 ms (1001 pts)
1 N 1 f 2.474 666 GHz 18.181 dBm
2 N 1 f 2.483 617 GHz -36.014 dBm
Marker
Select Marker 2
Normal
Delta
Fixed
Off
Properties
More 1 of 2
MSG
STATUS

Appendix A.4: Carrier Frequency Separation

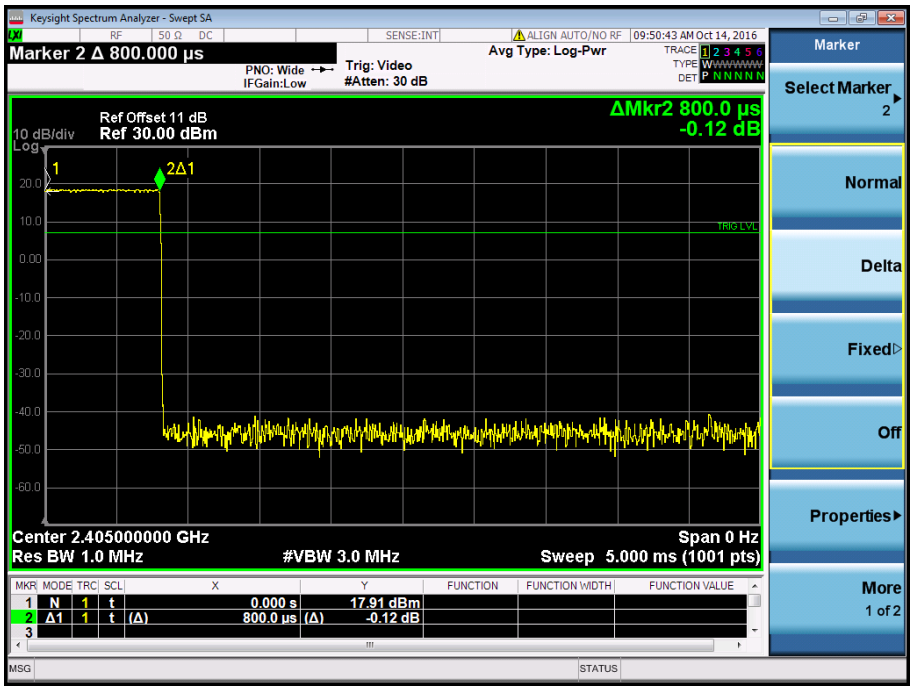


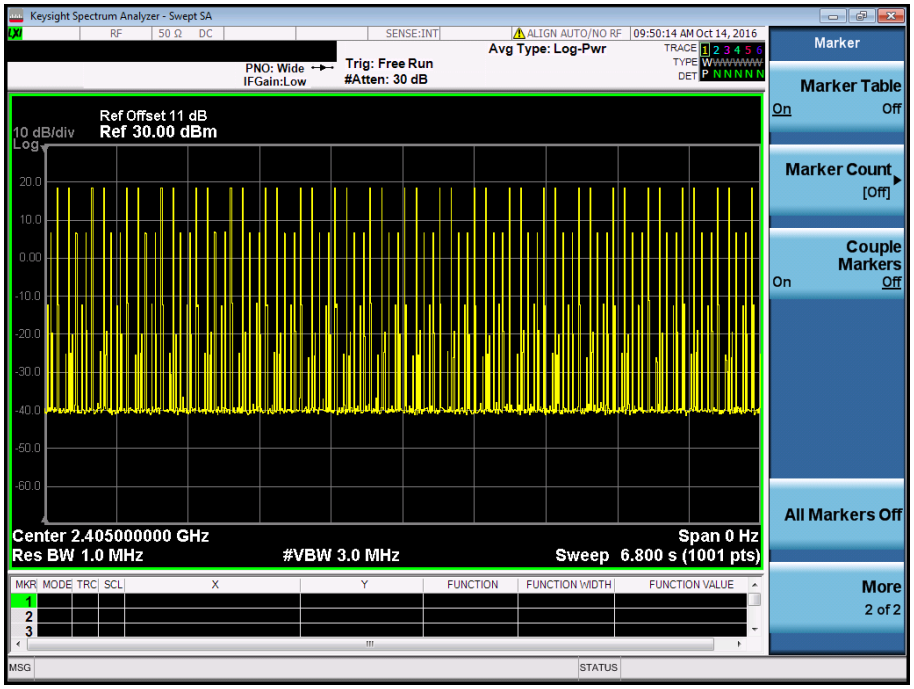


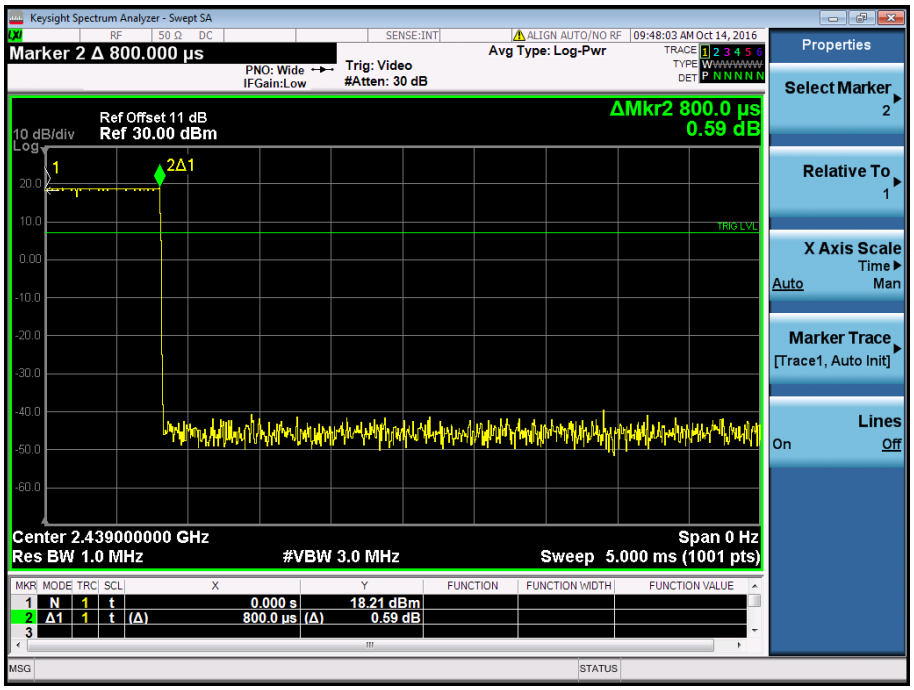
Appendix A.5: Number of Hopping Frequency

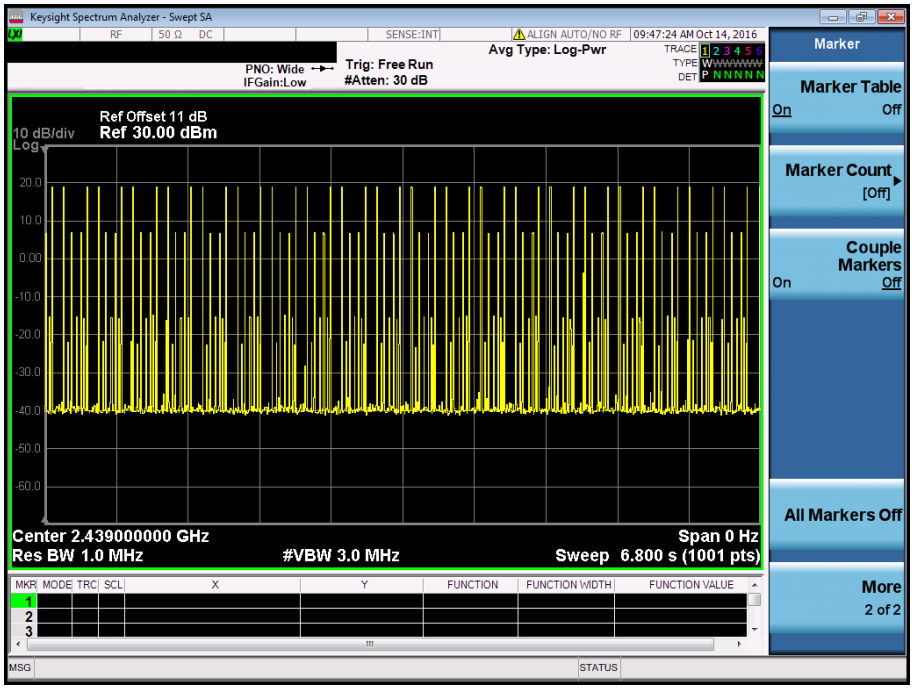


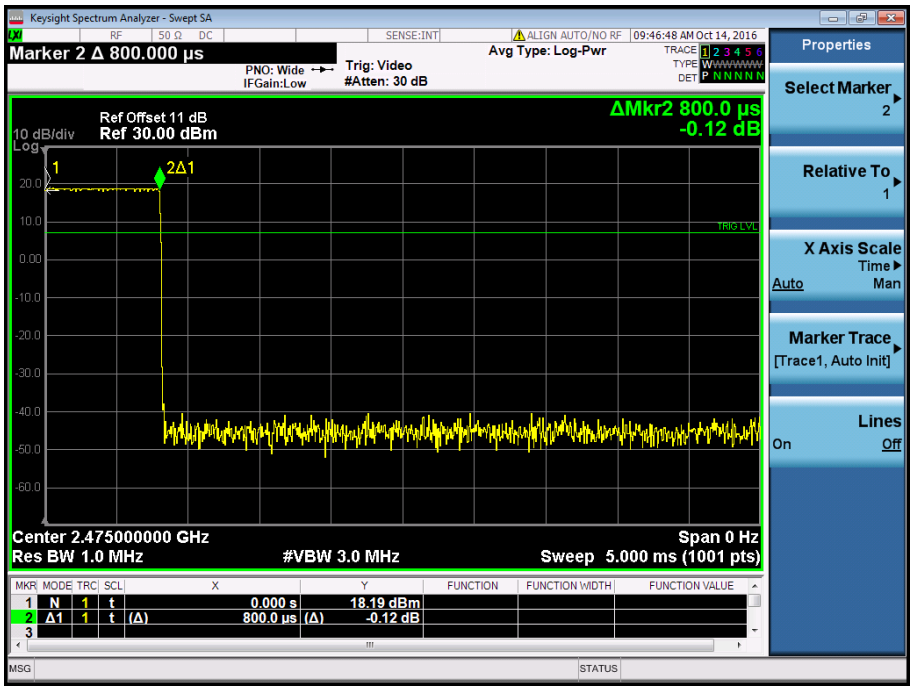
Appendix A.6: Time of Occupancy

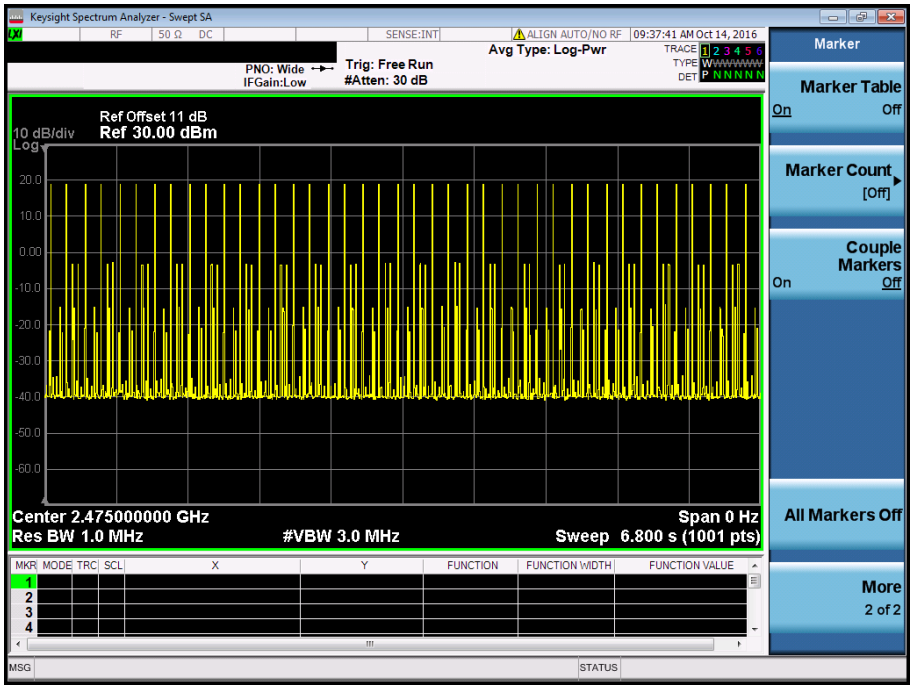





Keysight Spectrum Analyzer - Swept SA
Marker 2 Δ 800.000 µs
PNO: Wide
IFGain:Low
Trig: Video
#Atten: 30 dB
Avg Type: Log-Pwr
09:48:03 AM Oct 14, 2016
Ref Offset 11 dB
10 dB/div
Ref 30.00 dBm
ΔMkr2 800.0 µs
0.59 dB
Center 2.439000000 GHz
Res BW 1.0 MHz
#VBW 3.0 MHz
Span 0 Hz
Sweep 5.000 ms (1001 pts)
1 N 1 t 0.000 s 18.21 dBm
2 Δ1 1 t (Δ) 800.0 µs (Δ) 0.59 dB
Properties
Select Marker 2
Relative To 1
X Axis Scale Time Auto Man
Marker Trace [Trace1, Auto Init]
Lines On Off


Keysight Spectrum Analyzer - Swept SA
PNO: Wide
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
09:47:24 AM Oct 14, 2016
Ref Offset 11 dB
10 dB/div
Ref 30.00 dBm
Center 2.439000000 GHz
Res BW 1.0 MHz
#VBW 3.0 MHz
Span 0 Hz
Sweep 6.800 s (1001 pts)
Marker
Marker Table On Off
Marker Count [Off]
Couple Markers On Off
All Markers Off
More 2 of 2


Keysight Spectrum Analyzer - Swept SA
Marker 2 Δ 800.000 µs
PNO: Wide
IFGain:Low
Trig: Video
#Atten: 30 dB
Avg Type: Log-Pwr
09:46:48 AM Oct 14, 2016
Ref Offset 11 dB
10 dB/div
Ref 30.00 dBm
ΔMkr2 800.0 µs
-0.12 dB
Center 2.475000000 GHz
Res BW 1.0 MHz
#VBW 3.0 MHz
Span 0 Hz
Sweep 5.000 ms (1001 pts)
1 N 1 t 0.000 s 18.19 dBm
2 Δ1 1 t (Δ) 800.0 µs (Δ) -0.12 dB
Properties
Select Marker
Relative To
X Axis Scale
Marker Trace
[Trace1, Auto Init]
Lines


Keysight Spectrum Analyzer - Swept SA
PNO: Wide
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
09:37:41 AM Oct 14, 2016
Ref Offset 11 dB
10 dB/div
Ref 30.00 dBm
Center 2.475000000 GHz
Res BW 1.0 MHz
#VBW 3.0 MHz
Span 0 Hz
Sweep 6.800 s (1001 pts)
Marker
Marker Table
Marker Count
[Off]
Couple Markers
All Markers Off
More
2 of 2

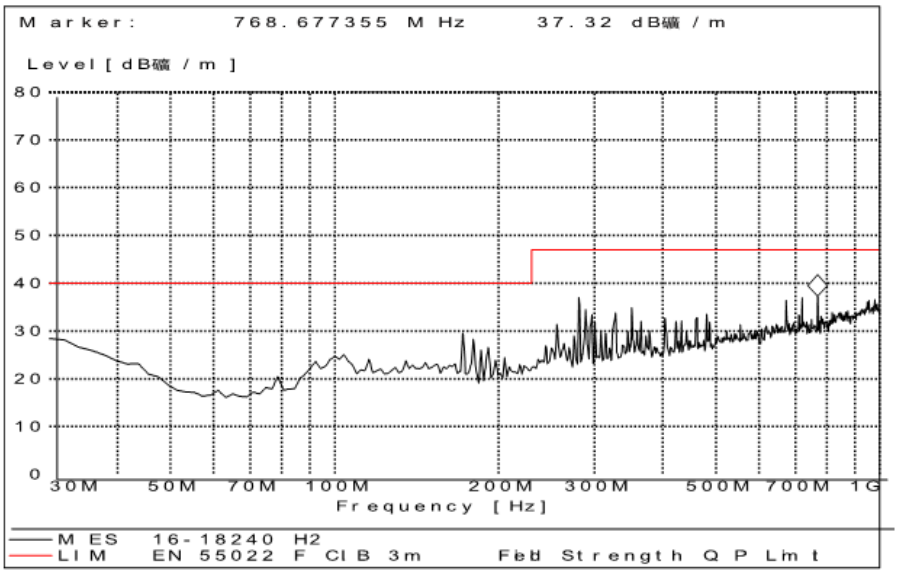
Appendix B

Test Results of General 2.4GHz wireless of Radiated Testing

Appendix B.1: Test Plots of Radiated Spurious Emission

30MHz - 1GHz

```
EUT:              S006AKU0500100_PU
Manufacturer::
Operating Condition: LOW Channel
Test Site:         Shenzhen Huatongwei International Co., Ltd
Operator:
Test Specification:  H
```



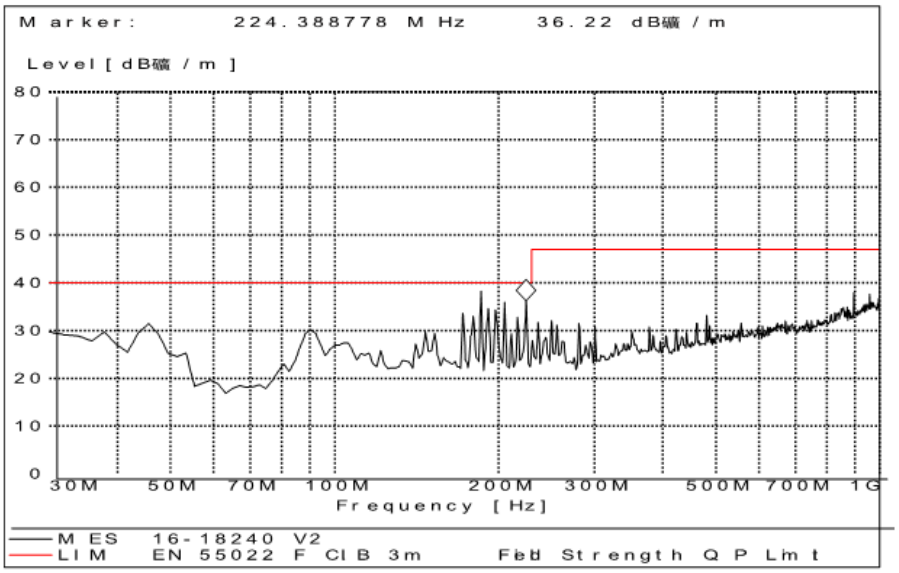
MEASUREMENT RESULT: "QuasiPeak"

```
2016-10-8  8:33
   Frequency    Level   Limit
        MHz   dBµV/m  dBµV/m

  30.000000    27.56   40.0
 170.840000    29.66   40.0
 768.510000    36.52   47.0
```

```
2016-10-8  8:33
```

EUT: S006AKU0500100_PU
Manufacturer::
Operating Condition: LOW Channel
Test Site: Shenzhen Huatongwei International Co., Ltd
Operator:
Test Specification: V



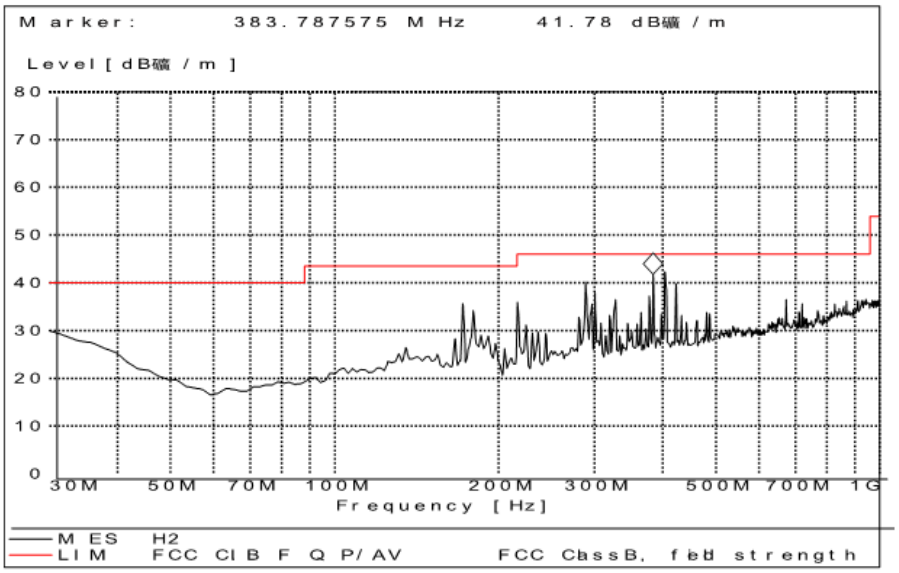
MEASUREMENT RESULT: "QuasiPeak"

2016-10-8 8:35

Frequency MHz	Level dBμV/m	Limit dBμV/m
46.3200000	29.69	40.0
184.620000	37.46	40.0
224.820000	35.19	40.0

2016-10-8 8:35

EUT: S006AKU0500100_PU
Manufacturer::
Operating Condition: MID Channel
Test Site: Shenzhen Huatongwei International Co., Ltd
Operator:
Test Specification: H



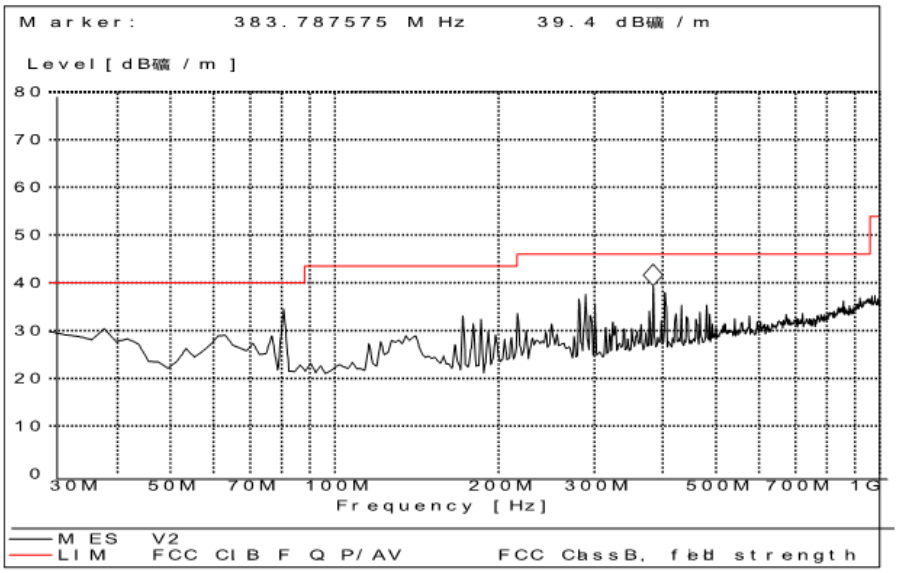
MEASUREMENT RESULT: "QuasiPeak"

2016-10-13 23:25

Frequency MHz	Level dBμV/m	Limit dBμV/m
171.910000	33.70	43.5
288.530000	38.17	46.0
383.780000	39.54	46.0

2016-10-13 23:25

EUT: S006AKU0500100_PU
Manufacturer::
Operating Condition: MID Channel
Test Site: Shenzhen Huatongwei International Co., Ltd
Operator:
Test Specification: V



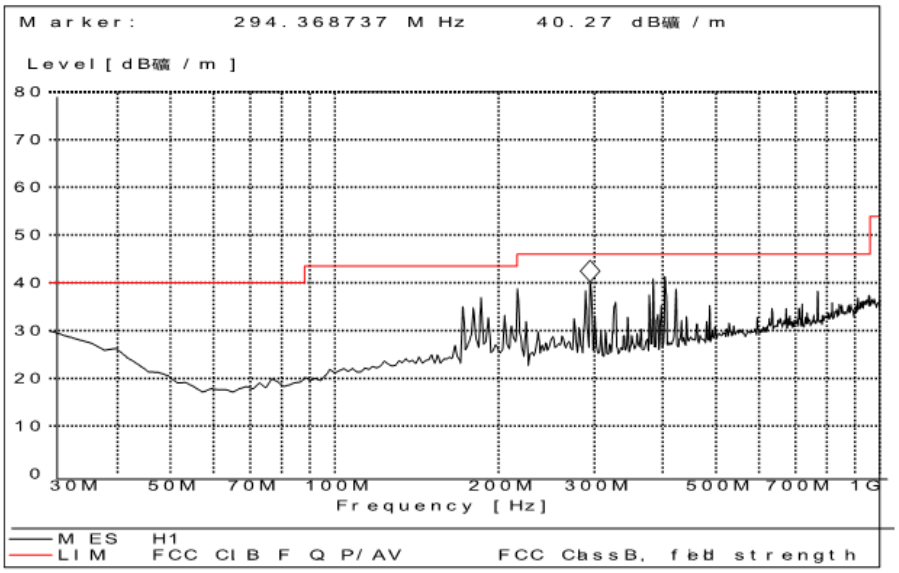
MEASUREMENT RESULT: "QuasiPeak"

2016-10-13 23:23

Frequency MHz	Level dBμV/m	Limit dBμV/m
80.540000	33.85	40.0
171.900000	30.57	43.5
383.780000	37.40	46.0

2016-10-13 23:23

EUT: S006AKU0500100_PU
Manufacturer::
Operating Condition: HIGH Channel
Test Site: Shenzhen Huatongwei International Co., Ltd
Operator:
Test Specification: H



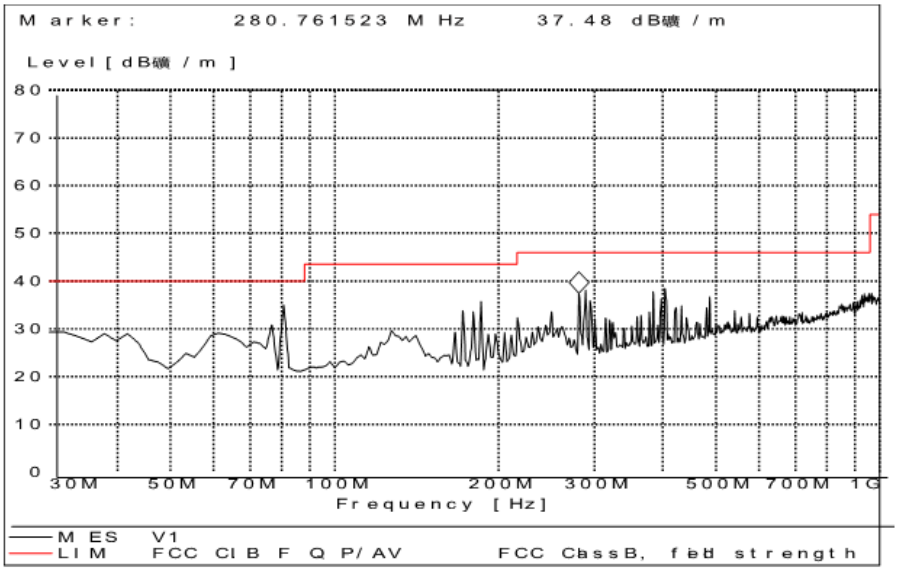
MEASUREMENT RESULT: "QuasiPeak"

2016-10-13 23:24

Frequency MHz	Level dBμV/m	Limit dBμV/m
185.510000	34.88	43.5
216.610000	36.74	43.5
294.360000	38.20	46.0

2016-10-13 23:24

EUT: S006AKU0500100_PU
Manufacturer::
Operating Condition: HIGH Channel
Test Site: Shenzhen Huatongwei International Co., Ltd
Operator:
Test Specification: V



MEASUREMENT RESULT: "QuasiPeak"

2016-10-13 23:21

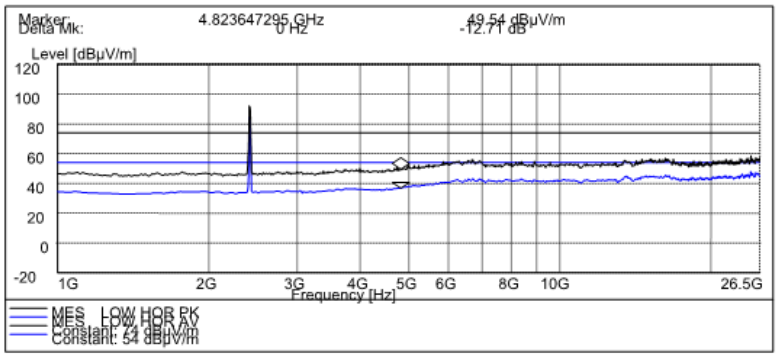
Frequency MHz	Level dBµV/m	Limit dBµV/m
80.540000	35.01	40.0
185.510000	35.77	43.5
280.760000	37.48	46.0

2016-10-13 23:21

1GHz - 26.5GHz

TEST

EUT: S006AKU0500100_PU
Manufacturer:
Operating Condition: LOW Channel
Test Site: Shenzhen Huatongwei International Co., Ltd
Operator:
Test Specification: HOR
Comment:



MEASUREMENT RESULT: "RE QP1"

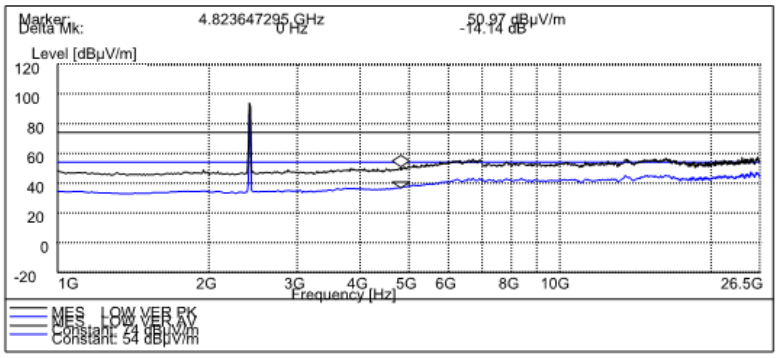
2016/10/09 04:25nm

Frequency GHz	Level dBµV	Limit QP dBµV/m	Level AV dBµV/m	Limit AV dBµV/m
6.354200000	53.68	74.00	42.15	54.00
6.954700000	54.02	74.00	42.36	54.00
15.25220000	53.60	74.00	44.49	54.00

2016/10/09 04:25nm

TEST

EUT: S006AKU0500100_PU
Manufacturer:
Operating Condition: LOW Channel
Test Site: Shenzhen Huatongwei International Co., Ltd
Operator:
Test Specification: VER
Comment:



MEASUREMENT RESULT: "RE QP1"

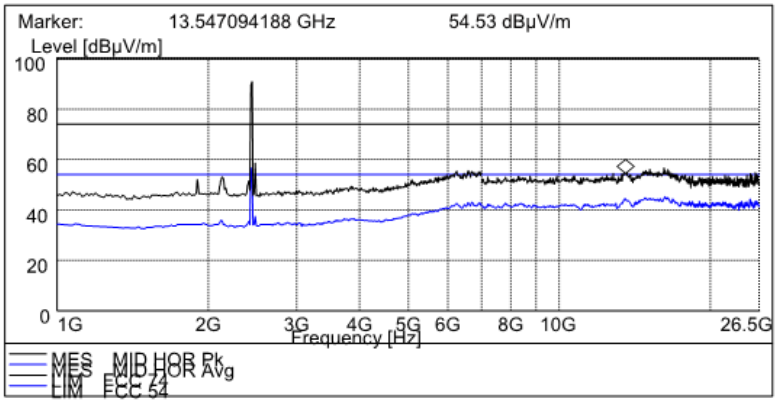
2016/10/09 04:23nm

Frequency GHz	Level dBµV	Limit QP dBµV/m	Level AV dBµV/m	Limit AV dBµV/m
6.362600000	53.12	74.00	41.47	54.00
6.914700000	54.15	74.00	42.03	54.00
15.23000000	53.84	74.00	45.00	54.00

2016/10/09 04:24nm

TEST

```
EUT:              S006AKU0500100_PU
Manufacturer:
Operating Condition: MID Channel
Test Site:         Shenzhen Huatongwei International Co., Ltd
Operator:
Test Specification:  HOR
Comment:
```



MEASUREMENT RESULT: "RE QP1"

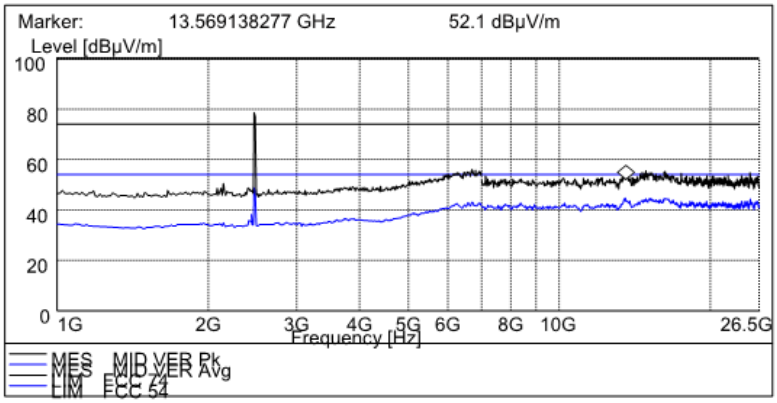
```
2016/10/13  10:11nm
   Frequency    Level  QP Limit AV Level  AV Limit
         GHz    dBµV  dBµV/m    dBµV/m    dBµV/m

 2.130200000    53.18  74         35.73     54.00
 6.555100000    53.46  74         41.96     54.00
13.547000000    54.35  74         44.18     54.00
```

```
2016/10/13  10:11nm
```

TEST

```
EUT:              S006AKU0500100_PU
Manufacturer:
Operating Condition: MID Channel
Test Site:         Shenzhen Huatongwei International Co., Ltd
Operator:
Test Specification:  VER
Comment:
```



MEASUREMENT RESULT: "RE QP1"

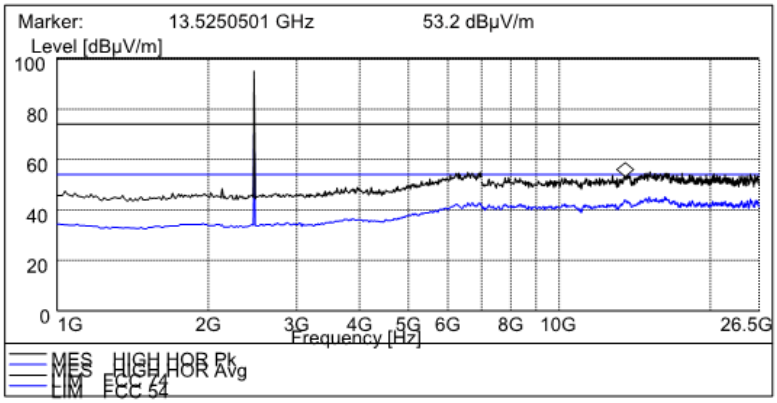
2016/10/13 10:09nm

Frequency GHz	Level dBµV	QP Limit dBµV/m	AV Level dBµV/m	AV Limit dBµV/m
6.206400000	54.14	74	42.10	54.00
10.196300000	52.65	74	41.63	54.00
13.547000000	52.18	74	43.93	54.00

2016/10/13 10:09nm

TEST

```
EUT:              S006AKU0500100_PU
Manufacturer:
Operating Condition: HIGH Channel
Test Site:         Shenzhen Huatongwei International Co., Ltd
Operator:
Test Specification:  HOR
Comment:
```



MEASUREMENT RESULT: "RE QP1"

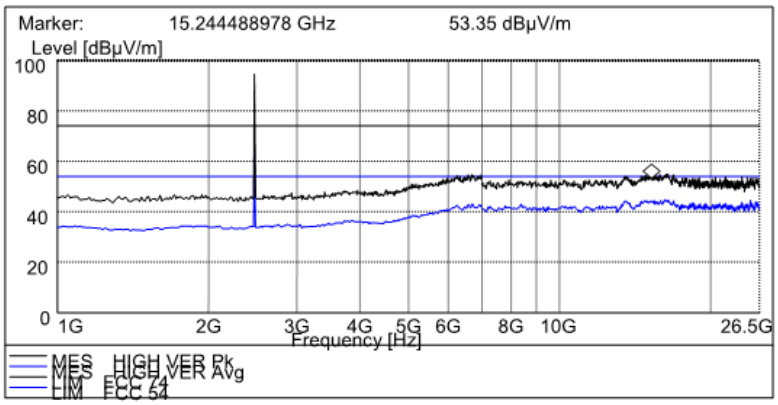
2016/10/13 10:07nm

Frequency GHz	Level dBµV	QP Limit dBµV/m	AV Level dBµV/m	AV Limit dBµV/m
6.206400000	53.13	74	42.10	54.00
7.793500000	52.78	74	41.93	54.00
13.480900000	53.74	74	43.91	54.00

2016/10/13 10:07nm

TEST

EUT: S006AKU0500100_PU
Manufacturer:
Operating Condition: HIGH Channel
Test Site: Shenzhen Huatongwei International Co., Ltd
Operator:
Test Specification: VER
Comment:



MEASUREMENT RESULT: "RE QP1"

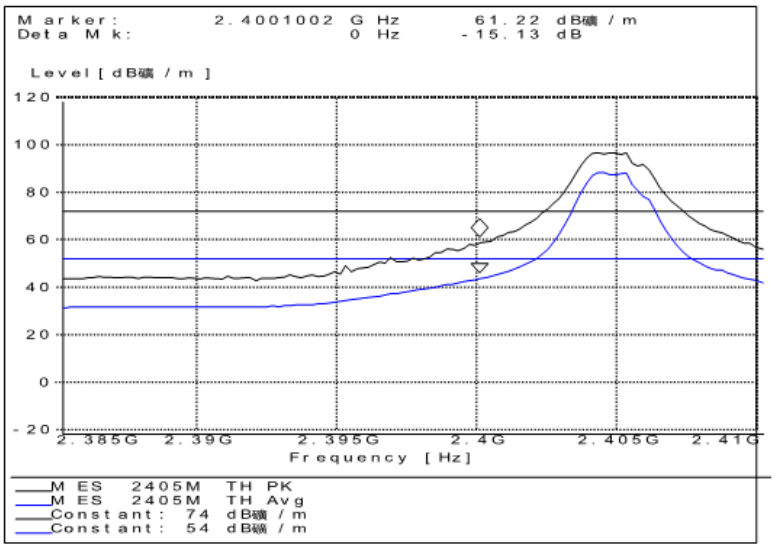
2016/10/13 10:08nm

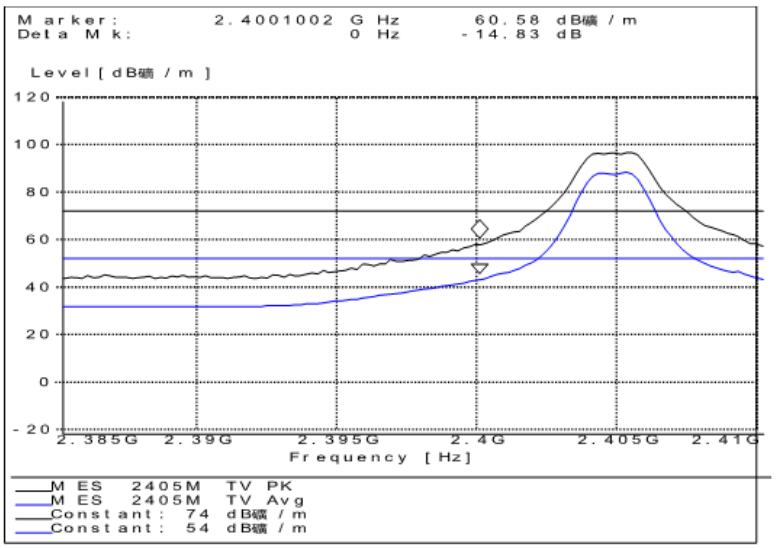
Frequency GHz	Level dBµV	QP Limit dBµV/m	AV Level dBµV/m	AV Limit dBµV/m
6.254500000	53.22	74	42.39	54.00
13.657400000	52.63	74	43.31	54.00
15.222400000	54.05	74	43.81	54.00

2016/10/13 10:08nm

Appendix B.2: Test Plots of Band Edge (Radiated)

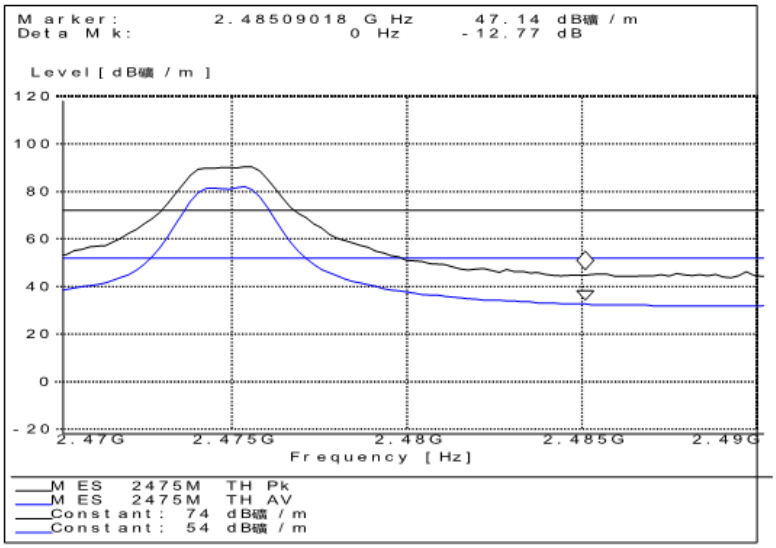
Low Channel

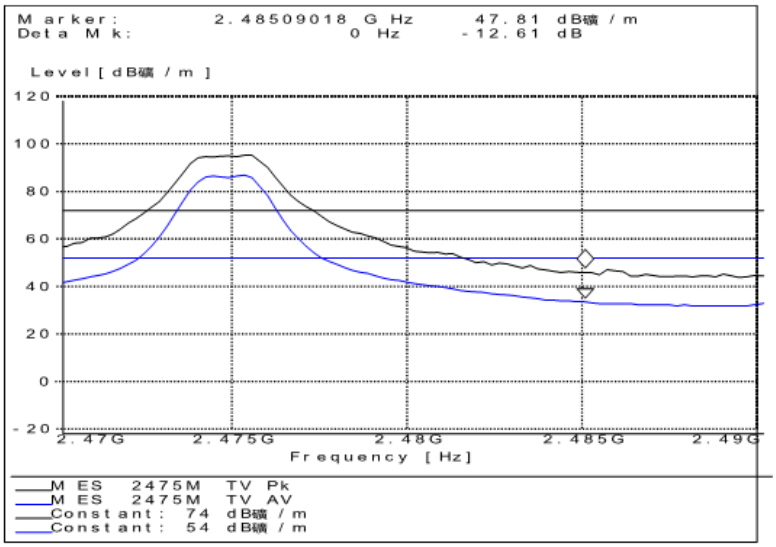




2016/10/14 12:30nm

High Channel





2016/10/14 12:25nm

Appendix B.3: Test Plots of Conducted Emission on AC Mains
C mode

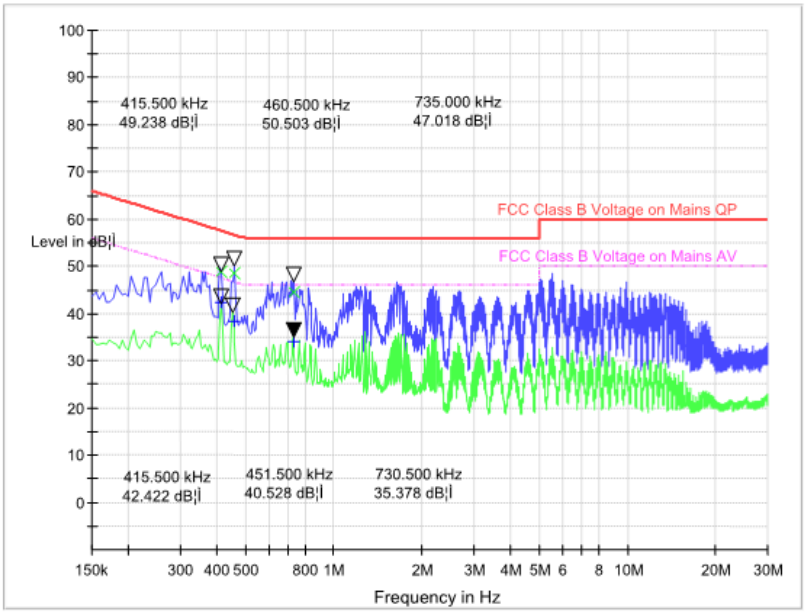
16-18240 L2

EMC32 Report

Common Information

Test Description:	EMC32 Standard Report Setup
Operating Conditions:	Connecting BU to PU with general 2.4GHz wireless
Operator Name:	
EUT:	S006AKU0500100_PU

FCC Class B Voltage Test



Limit and Margin

Frequency (MHz)	MaxPeak (dBµV)	QuasiPeak (dBµV)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)	Margin - QPK (dB)
0.415500	---	48.72	42.36	1000.0	9.000	L1	OFF	10.0	8.82
0.460500	---	48.69	38.24	1000.0	9.000	L1	OFF	10.0	7.99
0.735000	---	44.62	33.94	1000.0	9.000	L1	OFF	10.1	11.38

(continuation of the "Limit and Margin" table from column 15 ...)

Frequency (MHz)	Limit - QPK (dBµ	Comment
0.415500	57.5	
0.460500	56.7	
0.735000	56.0	

2016-9-30 15:58:41

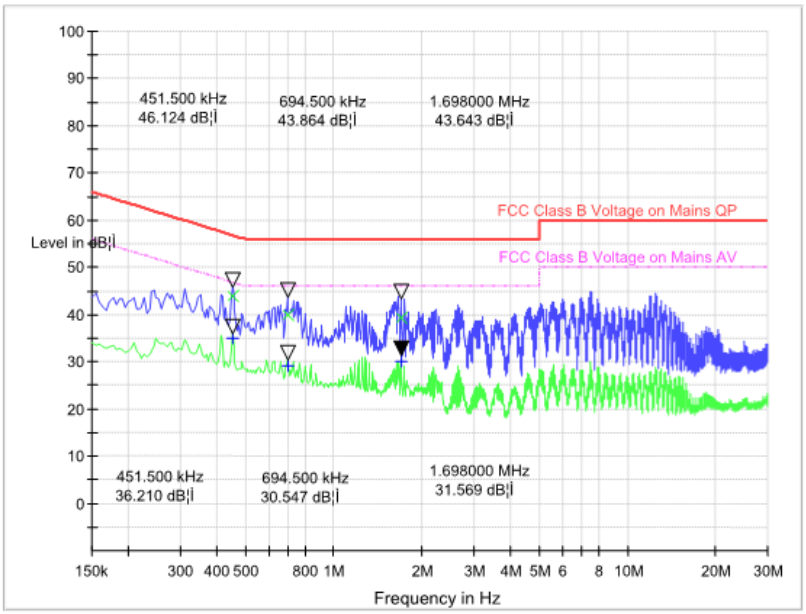
16-18240 N2

EMC32 Report

Common Information

Test Description:	EMC32 Standard Report Setup
Operating Conditions:	Connecting BU to PU with general 2.4GHz wireless
Operator Name:	
EUT:	S006AKU0500100_PU

FCC Class B Voltage Test



Limit and Margin

Frequency (MHz)	MaxPeak (dBµV)	QuasiPeak (dBµV)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)	Margin - QPK (dB)
0.451500	---	43.79	35.06	1000.0	9.000	N	OFF	10.0	13.06
0.694500	---	39.80	29.14	1000.0	9.000	N	OFF	10.1	16.20
1.698000	---	39.33	30.05	1000.0	9.000	N	OFF	10.0	16.67

(continuation of the "Limit and Margin" table from column 15 ...)

Frequency (MHz)	Limit - QPK (dBµ	Comment
0.451500	56.8	
0.694500	56.0	
1.698000	56.0	

2016-9-30 15:54:13

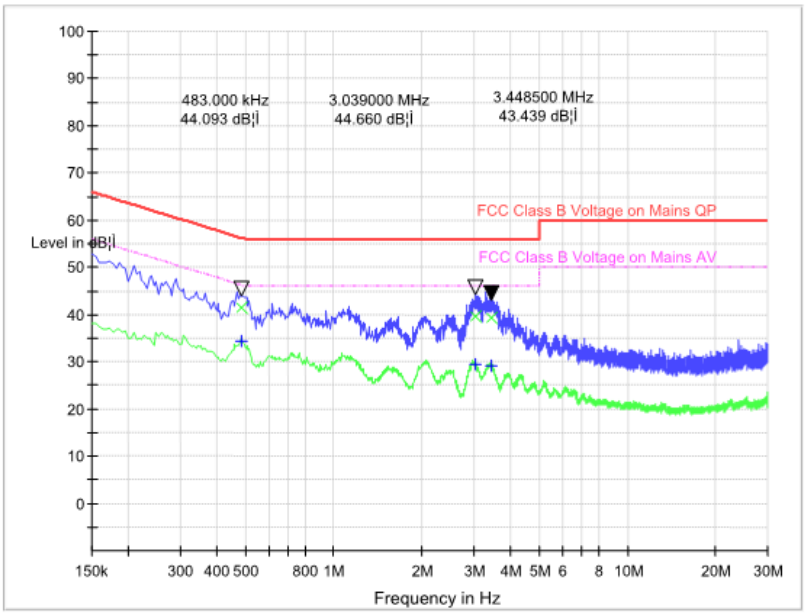
D mode

EMC32 Report

Common Information

Test Description:	EMC32 Standard Report Setup
Operating Conditions:	PC+USB+PU, Charging mode
Operator Name:	
EUT:	PU

FCC Class B Voltage Test



Limit and Margin

Frequency (MHz)	MaxPeak (dBµV)	QuasiPeak (dBµV)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)	Margin - QPK (dB)
0.483000	---	41.53	34.22	1000.0	9.000	L1	OFF	10.0	14.76
3.039000	---	39.76	29.42	1000.0	9.000	L1	OFF	9.9	16.24
3.448500	---	39.45	29.16	1000.0	9.000	L1	OFF	9.9	16.55

(continuation of the "Limit and Margin" table from column 15 ...)

Frequency (MHz)	Limit - QPK (dBµ	Comment
0.483000	56.3	
3.039000	56.0	
3.448500	56.0	

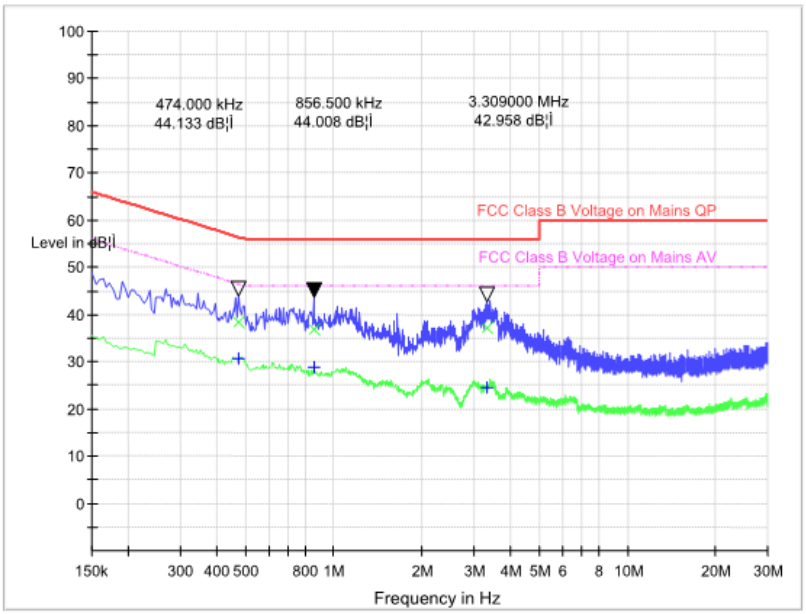
2016-10-11 10:57:35

EMC32 Report

Common Information

Test Description:	EMC32 Standard Report Setup
Operating Conditions:	PC+USB+PU, Charging mode
Operator Name:	
EUT:	PU

FCC Class B Voltage Test



Limit and Margin

Frequency (MHz)	MaxPeak (dBµV)	QuasiPeak (dBµV)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)	Margin - QPK (dB)
0.474000	---	38.43	30.73	1000.0	9.000	N	OFF	10.0	18.01
0.856500	---	36.80	28.80	1000.0	9.000	N	OFF	10.0	19.20
3.309000	---	37.23	24.54	1000.0	9.000	N	OFF	9.9	18.77

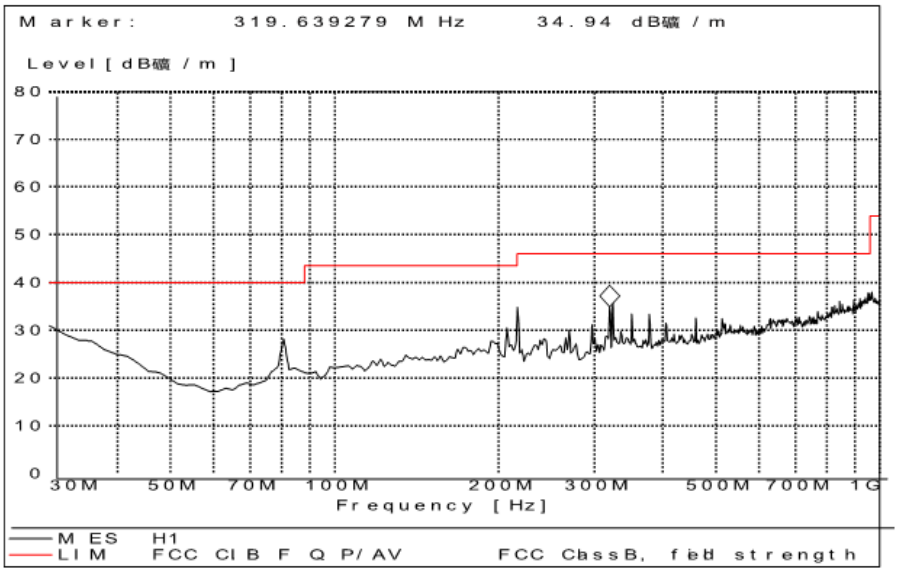
(continuation of the "Limit and Margin" table from column 15 ...)

Frequency (MHz)	Limit - QPK (dBµ	Comment
0.474000	56.4	
0.856500	56.0	
3.309000	56.0	

2016-10-11 11:02:14

Appendix B.4: Test Plots of Radiated Emission
D mode, Below 1GHz

EUT: PU
Manufacturer::
Operating Condition: PC+PC Adaptor+USB, Charging mode
Test Site: Shenzhen Huatongwei International Co., Ltd
Operator:
Test Specification: H



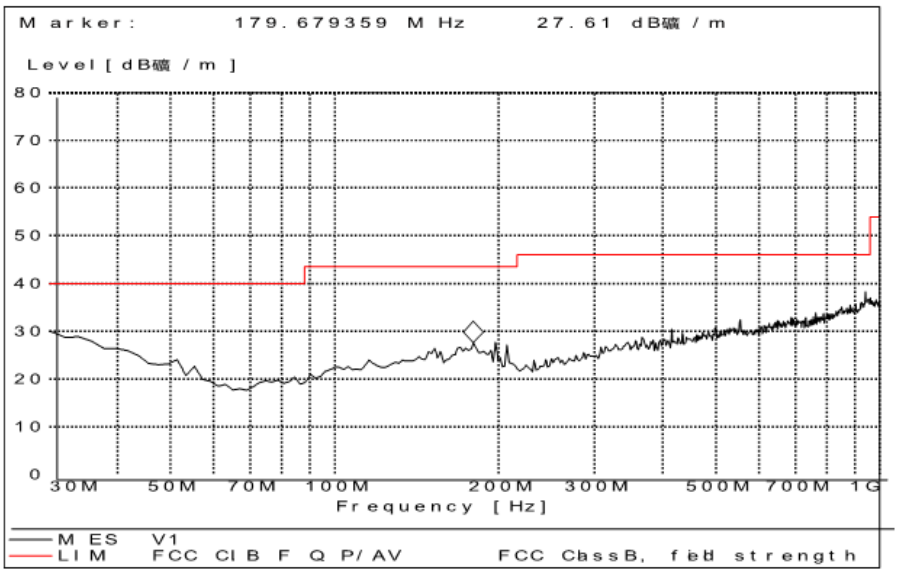
MEASUREMENT RESULT: "QuasiPeak"

2016-10-14 8:22

Frequency MHz	Level dBµV/m	Limit dBµV/m
80.540000	26.15	40.0
216.610000	32.57	46.0
319.640000	32.90	46.0

2016-10-14 8:22

EUT: PU
Manufacturer::
Operating Condition: PC+PC Adaptor+USB, Charging mode
Test Site: Shenzhen Huatongwei International Co., Ltd
Operator:
Test Specification: V



MEASUREMENT RESULT: "QuasiPeak"

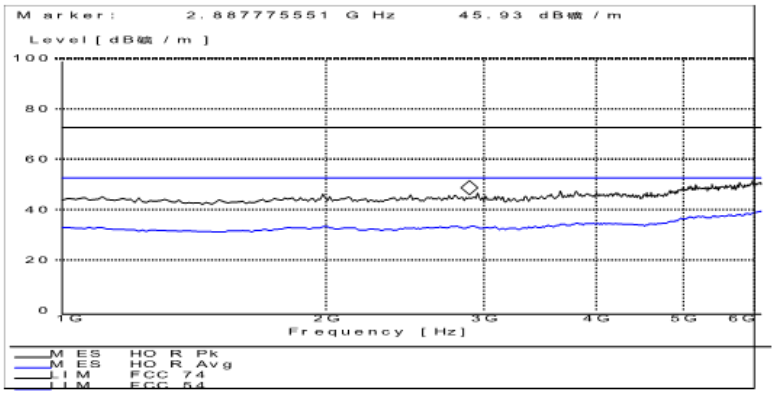
2016-10-14 8:23

Frequency MHz	Level dBµV/m	Limit dBµV/m
30.000000	28.21	40.0
152.460000	24.40	43.5
179.670000	25.61	43.5

2016-10-14 8:23

D mode, Above 1GHz

EUT: PU
Manufacturer::
Operating Condition: PC+PC Adaptor+USB, Charging mode
Test Site: Shenzhen Huatongwei International Co., Ltd
Operator:
Test Specification: HOR



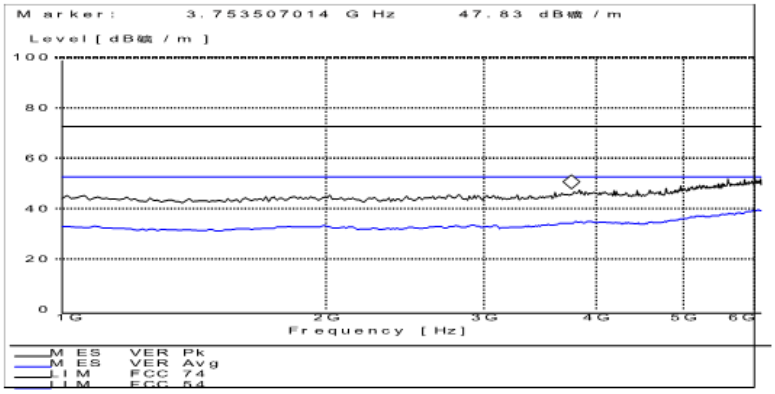
MEASUREMENT RESULT: "RE QP1"

2016/10/14 02:12nm

Frequency GHz	Level dBµV	QP Limit dBµV/m	AV Level dBµV/m	AV Limit dBµV/m
1.216400000	46.06	74.00	32.87	54.00
1.949500000	47.59	74.00	34.66	54.00
2.899700000	47.99	74.00	34.55	54.00

2016/10/14 02:13nm

EUT: PU
Manufacturer::
Operating Condition: PC+PC Adaptor+USB, Charging mode
Test Site: Shenzhen Huatongwei International Co., Ltd
Operator:
Test Specification: VER



MEASUREMENT RESULT: "RE QP1"

2016/10/14 02:13nm

Frequency GHz	Level dBµV	QP Limit dBµV/m	AV Level dBµV/m	AV Limit dBµV/m
1.384700000	45.46	74.00	32.92	54.00
2.767500000	47.03	74.00	34.46	54.00
3.765500000	48.69	74.00	36.15	54.00

2016/10/14 02:13nm