

Variant FCC RF Test Report

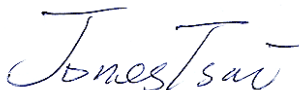
APPLICANT : DELL Inc.
EQUIPMENT : Tablet PC
BRAND NAME : Dell
MODEL NAME : T01C; T01C003
TYPE NAME : T01C003
FCC ID : E2K-T01C003
STANDARD : FCC Part 15 Subpart C §15.247
CLASSIFICATION : (DTS) Digital Transmission System

This is a variant report which is only valid together with the original test report. The product was received on May 30, 2014 and testing was completed on Sep. 15, 2014. We, SPORTON INTERNATIONAL (KUNSHAN) INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures and the testing has shown the tested sample to be in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL (KUNSHAN) INC., the test report shall not be reproduced except in full.



Reviewed by: Joseph Lin / Supervisor



Approved by: Jones Tsai / Manager



SPORTON INTERNATIONAL (KUNSHAN) INC.
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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR422417-01C	Rev. 01	This is a variant report for T01C; T01C003. The product equality declaration could be referred to Appendix B. Based on the similarity between two models, only the worst case of Radiated Spurious Emission from original test report (Sporton Report Number FR422417C) was verified.	Oct. 31, 2014



SUMMARY OF TEST RESULT

Report Section	FCC Rule	IC Rule	Description	Limit	Result	Remark
3.1	15.247(d)	RSS-210 A8.5	Radiated Band Edges and Radiated Spurious Emission	15.209(a) & 15.247(d)	Pass	Under limit 2.49 dB at 2483.500 MHz



1 General Description

1.1 Applicant

DELL Inc.

One Dell Way, Round Rock, Texas 78682, United States

1.2 Manufacturer

DELL Inc.

One Dell Way, Round Rock, Texas 78682, United States

1.3 Feature of Equipment Under Test

Product Feature	
Equipment	Tablet PC
Brand Name	Dell
Model Name	T01C; T01C003
Type Name	T01C003
FCC ID	E2K-T01C003
EUT supports Radios application	WLAN 2.4GHz 802.11b/g/n HT20/HT40/ WLAN 5GHz 802.11a/n HT20/HT40/ WLAN 5GHz 802.11ac VHT20/VHT40/VHT80/ Bluetooth v3.0 + EDR/Bluetooth v4.0 LE
HW Version	B2
SW Version	Venue7 3740_V1.84_140916-NoModem
EUT Stage	Identical Prototype

1.4 Product Specification of Equipment Under Test

Product Specification subjective to this standard	
Tx/Rx Channel Frequency Range	802.11b/g/n : 2412 MHz ~ 2462 MHz 802.11a/n/ac: 5745~5825MHz.
Antenna Type	802.11b/g/n : IFA Antenna 802.11a/n/ac : IFA Antenna
Type of Modulation	802.11b : DSSS (DBPSK / DQPSK / CCK) 802.11a/g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM) 802.11ac : OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)

Remark:

1. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.
2. There are five types of EUT for this project. The differences between them are summary below:

Sample List	RAM	ROM	CPU	Front Camera	Rear Camera	LCD	PCBA	Color
Sample 1	1G	16G	1.6 PRQ	OV	Liteon	CPT without EMI coating	Chinabuild	Black
Sample 2	2G	16G	1.6 QS	OV	Liteon	AUO with EMI coating	Tripod	Red
Sample 3	2G	16G	1.6 QS	OV	Liteon	CPT with EMI coating	Chinabuild	Black
Sample 4	2G	16G	1.6 QS	OV	Liteon	AUO without EMI coating	Chinabuild	Red
Sample 5	2G	16G	1.6 QS	OV	Liteon	AUO without EMI coating	Tripod	Red

1.5 Modification of EUT

No modifications are made to the EUT during all test items.

1.6 Testing Location

Test Site	SPORTON INTERNATIONAL (KUNSHAN) INC.	
Test Site Location	No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P.R.C.	
	TEL: +86-0512-5790-0158 FAX: +86-0512-5790-0958	
Test Site No.	Sporton Site No.	FCC/IC Registration No.
	03CH01-KS	149928/4086E-1

Note: The test site complies with ANSI C63.4 2003 requirement.

1.7 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ FCC Part 15 Subpart C §15.247
- ♦ FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v03r01
- ♦ ANSI C63.4-2003

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

2 Test Configuration of Equipment Under Test

2.1 Carrier Frequency Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
2400-2483.5 MHz	1	2412	7	2442
	2	2417	8	2447
	3	2422	9	2452
	4	2427	10	2457
	5	2432	11	2462
	6	2437	-	-

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
5725-5850 MHz Band 4	149	5745	157	5785
	151	5755	159	5795
	153	5765	161	5805
	155	5775	165	5825

2.2 Test Mode

Final results of test modes, data rates and test channels are shown as following table.

<2.4GHz>

Test Cases				
Radiated TCs	Test Items	Mode	Data Rate	Test Channel
	Radiated Band Edge	802.11b	1 Mbps	11
		802.11g	6 Mbps	11
		802.11n HT20	MCS0	11
		802.11n HT40	MCS0	9
	Radiated Spurious Emission	802.11b	1 Mbps	11
		802.11g	6 Mbps	11
		802.11n HT20	MCS0	11
		802.11n HT40	MCS0	9

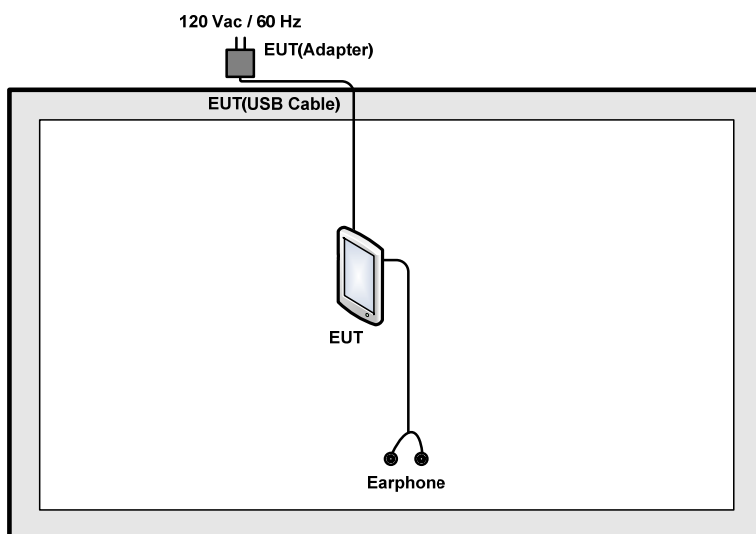
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Test Cases				
Radiated TCs	Test Items	Mode	Data Rate	Test Channel
	Radiated Spurious Emission	802.11a	6 Mbps	157
		802.11n HT20	MCS0	157
		802.11n HT40	MCS0	159
		802.11ac VHT20	MCS0	157
		802.11ac VHT40	MCS0	159
		802.11ac VHT80	MCS0	155

Remark:

For Radiated TCs, all the test modes were performed with Adapter, Earphone and USB Cable for Sample 1, only the worst mode (802.11b CH11) based on Sample 1 need to verify Sample 2 and Sample 3.

2.3 Connection Diagram of Test System



2.4 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Earphone	Lenovo	SH100	FCC DoC	N/A	N/A

2.5 EUT Operation Test Setup

For WLAN RF test items, an engineering test program was provided and enabled to make EUT continuous transmit/receive.

3 Test Result

3.1 Radiated Band Edges and Spurious Emission Measurement

3.1.1 Limit of Radiated band edge and Spurious Emission Measurement

In any 100 kHz bandwidth outside the intentional radiator frequency band, all harmonics/spurious must be at least 20 dB below the highest emission level within the authorized band. If the output power of this device was measured by spectrum analyzer, the attenuation under this paragraph shall be 30 dB instead of 20 dB. In addition, radiated emissions which fall in the restricted bands must also comply with the FCC section 15.209 limits as below.

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3

3.1.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.1.3 Test Procedures

1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v03r01.
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level.
3. The EUT was placed on a turntable with 0.8 meter above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
6. For measurement below 1GHz, If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
7. Use the following spectrum analyzer settings:
 - (1) Span shall wide enough to fully capture the emission being measured;
 - (2) Set RBW=100 kHz for $f < 1$ GHz; VBW $\geq$ RBW; Sweep = auto; Detector function = peak; Trace = max hold;
 - (3) Set RBW = 1 MHz, VBW= 3MHz for $f \geq 1$ GHz for peak measurement.

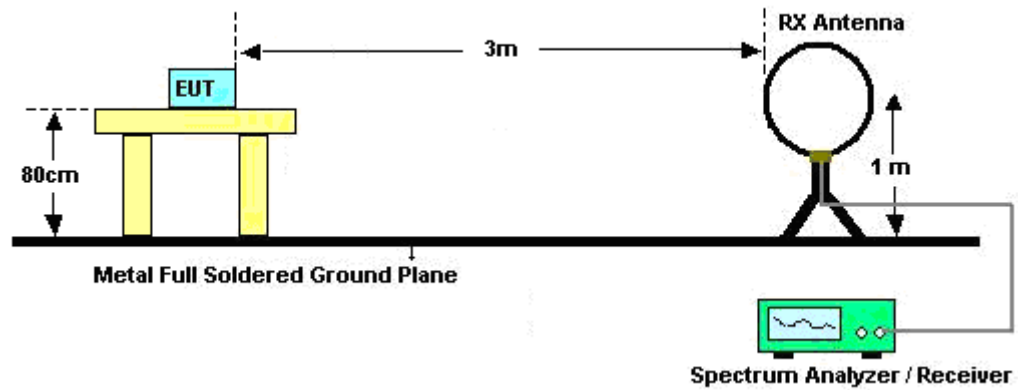
For average measurement:

 - VBW = 10 Hz, when duty cycle is no less than 98 percent.
 - VBW $\geq 1/T$, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

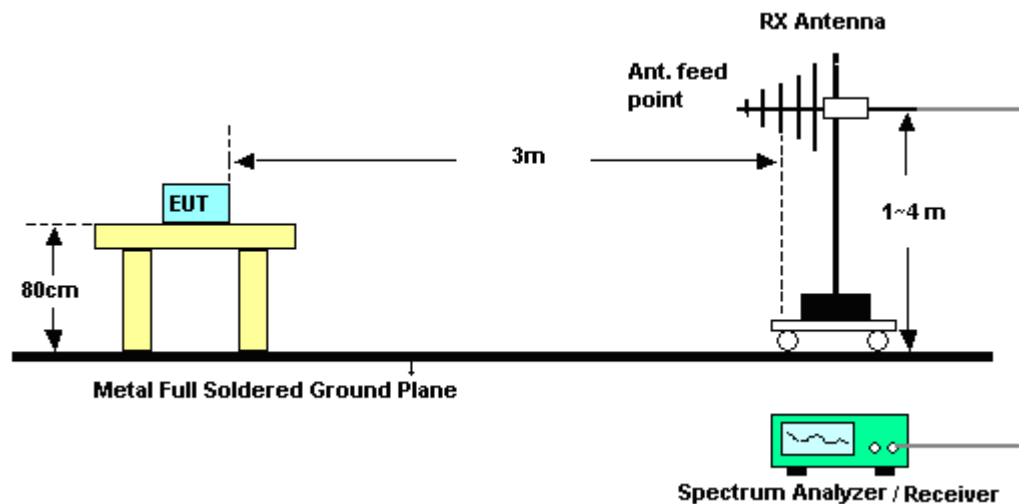
Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
802.11b	99.083	-	-	10Hz
802.11g	93.872	1.440	0.694	1kHz
2.4GHz 802.11n HT20	92.105	1.330	0.752	1kHz
2.4GHz 802.11n HT40	86.889	0.676	1.479	3kHz
802.11a	93.963	1.432	0.698	1kHz
5GHz 802.11n HT20	93.056	1.340	0.746	1kHz
5GHz 802.11n HT40	86.528	0.668	1.497	3kHz
5GHz 802.11ac VHT20	93.103	1.350	0.741	1kHz
5GHz 802.11ac VHT40	86.598	0.672	1.488	3kHz
5GHz 802.11ac VHT80	76.959	0.334	2.994	3kHz

3.1.4 Test Setup

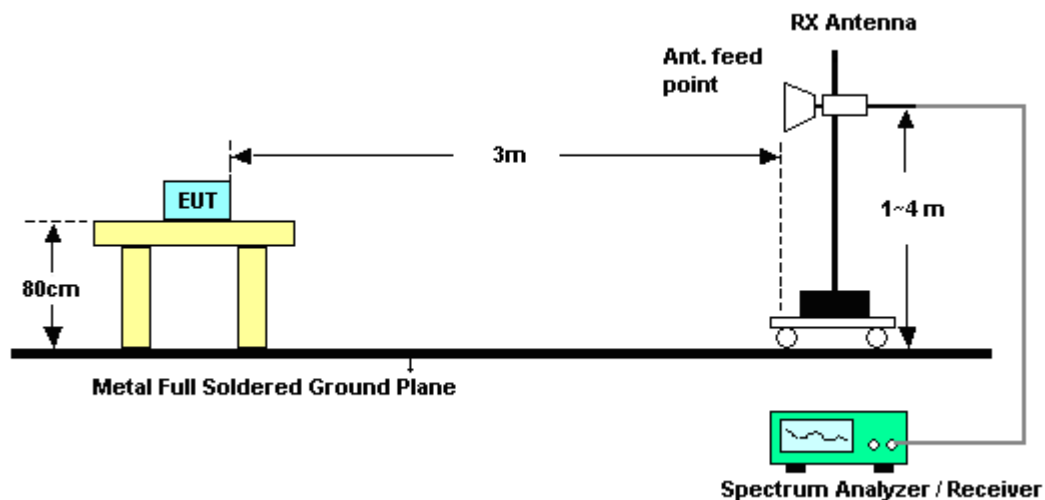
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



3.1.5 Test Results of Radiated Spurious Emissions (9kHz ~ 30MHz)

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

3.1.6 Test Result of Radiated Spurious at Band Edges

<Sample 1>

Test Mode :	802.11b	Temperature :	22~23°C
Test Band :	High	Relative Humidity :	42~43%
Test Channel :	11	Test Engineer :	Star Wei

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2484.91	63.82	-10.18	74	60.45	33.01	3.65	33.29	100	120	Peak
2483.5	47.08	-6.92	54	43.71	33.01	3.65	33.29	100	41	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2486.08	64.05	-9.95	74	60.68	33.01	3.65	33.29	200	154	Peak
2483.5	51.51	-2.49	54	48.14	33.01	3.65	33.29	200	120	Average

Test Mode :	802.11g	Temperature :	22~23°C
Test Band :	High	Relative Humidity :	42~43%
Test Channel :	11	Test Engineer :	Star Wei

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.62	69.42	-4.58	74	66.05	33.01	3.65	33.29	100	59	Peak
2483.56	47.41	-6.59	54	44.04	33.01	3.65	33.29	100	245	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.68	69.44	-4.56	74	66.07	33.01	3.65	33.29	100	75	Peak
2484.07	46.09	-7.91	54	42.72	33.01	3.65	33.29	100	130	Average



Test Mode :	802.11n HT20	Temperature :	22~23°C
Test Band :	High	Relative Humidity :	42~43%
Test Channel :	11	Test Engineer :	Star Wei

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.83	65.15	-8.85	74	61.78	33.01	3.65	33.29	200	140	Peak
2489.14	39.15	-14.85	54	35.74	33.05	3.66	33.3	120	145	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.5	70.2	-3.8	74	66.83	33.01	3.65	33.29	100	290	Peak
2490.19	37.67	-16.33	54	34.26	33.05	3.66	33.3	100	290	Average

Test Mode :	802.11n HT40	Temperature :	22~23°C
Test Band :	High	Relative Humidity :	42~43%
Test Channel :	09	Test Engineer :	Star Wei

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2388.12	51.2	-22.8	74	48.01	32.86	3.59	33.26	200	103	Peak
2389.11	36.34	-17.66	54	33.15	32.86	3.59	33.26	120	100	Average
2488.09	68.99	-5.01	74	65.58	33.05	3.66	33.3	105	138	Peak
2491.12	46.89	-7.11	54	43.48	33.05	3.66	33.3	105	138	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2377.95	49.23	-24.77	74	46.08	32.83	3.58	33.26	200	170	Peak
2389.38	37.02	-16.98	54	33.83	32.86	3.59	33.26	100	145	Average
2484.19	65.84	-8.16	74	62.47	33.01	3.65	33.29	200	360	Peak
2495.05	43.34	-10.66	54	39.93	33.05	3.66	33.3	100	20	Average

<Sample 2>

Test Mode :	802.11b	Temperature :	22~23°C
Test Band :	High	Relative Humidity :	42~43%
Test Channel :	11	Test Engineer :	Star Wei

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2486.02	61.67	-12.33	74	58.3	33.01	3.65	33.29	200	297	Peak
2483.5	47.3	-6.7	54	43.93	33.01	3.65	33.29	200	297	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2485.3	57.77	-16.23	74	54.4	33.01	3.65	33.29	100	32	Peak
2483.5	44.22	-9.78	54	40.85	33.01	3.65	33.29	100	32	Average

<Sample 3>

Test Mode :	802.11b	Temperature :	22~23°C
Test Band :	High	Relative Humidity :	42~43%
Test Channel :	11	Test Engineer :	Star Wei

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.95	59.42	-14.58	74	56.05	33.01	3.65	33.29	133	275	Peak
2483.5	45.95	-8.05	54	42.58	33.01	3.65	33.29	133	275	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.59	56.03	-17.97	74	52.66	33.01	3.65	33.29	100	48	Peak
2483.5	41.85	-12.15	54	38.48	33.01	3.65	33.29	100	48	Average

3.1.7 Test Result of Radiated Spurious Emission (30MHz ~ 10th Harmonic)

<Sample 1>

Test Mode :	802.11b	Temperature :	22~23°C
Test Channel :	11	Relative Humidity :	42~43%
Test Engineer :	Star Wei	Polarization :	Horizontal
Remark :	1. 2462 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
97.9	25.47	-18.03	43.5	48.03	10.15	0.91	33.62	-	-	Peak
191.02	32.11	-11.39	43.5	55.86	8.55	1.26	33.56	100	132	Peak
378.23	20.78	-25.22	46	36.96	15.38	1.77	33.33	-	-	Peak
551.86	21.34	-24.66	46	33.75	18.5	2.1	33.01	-	-	Peak
744.89	20.08	-25.92	46	30.56	19.86	2.45	32.79	-	-	Peak
913.67	24.49	-21.51	46	33.65	20.51	2.76	32.43	-	-	Peak
2462	110.53	-	-	107.2	32.98	3.64	33.29	200	324	Peak
2462	104.76	-	-	101.43	32.98	3.64	33.29	200	324	Average
4924	47.18	-26.82	74	40.48	35.19	5.31	33.8	100	63	Peak
7386	49.08	-24.92	74	40.3	36.24	6.7	34.16	112	162	Peak

Test Mode :	802.11b	Temperature :	22~23°C
Test Channel :	11	Relative Humidity :	42~43%
Test Engineer :	Star Wei	Polarization :	Vertical
Remark :	1. 2462 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
46.49	28.11	-11.89	40	52.2	8.88	0.64	33.61	100	184	Peak
188.11	28.83	-14.67	43.5	52.66	8.48	1.25	33.56	-	-	Peak
461.65	22.31	-23.69	46	37.08	16.46	1.96	33.19	-	-	Peak
558.65	22.23	-23.77	46	34.58	18.51	2.15	33.01	-	-	Peak
744.89	21.18	-24.82	46	31.66	19.86	2.45	32.79	-	-	Peak
858.38	19	-27	46	28.54	20.5	2.65	32.69	-	-	Peak
2462	108.8	-	-	105.47	32.98	3.64	33.29	108	25	Peak
2462	103.56	-	-	100.23	32.98	3.64	33.29	108	25	Average
4924	47.06	-26.94	74	40.36	35.19	5.31	33.8	147	85	Peak
7386	49.09	-24.91	74	40.31	36.24	6.7	34.16	122	32	Peak

Test Mode :	802.11g	Temperature :	22~23°C
Test Channel :	11	Relative Humidity :	42~43%
Test Engineer :	Star Wei	Polarization :	Horizontal
Remark :	1. 2462 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2462	109.1	-	-	105.77	32.98	3.64	33.29	100	323	Peak
2462	98.51	-	-	95.18	32.98	3.64	33.29	100	323	Average
4924	46.87	-27.13	74	40.17	35.19	5.31	33.8	100	263	Peak
7386	49.51	-24.49	74	40.73	36.24	6.7	34.16	100	54	Peak

Test Mode :	802.11g	Temperature :	22~23°C
Test Channel :	11	Relative Humidity :	42~43%
Test Engineer :	Star Wei	Polarization :	Vertical
Remark :	1. 2462 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2462	106.89	-	-	103.56	32.98	3.64	33.29	100	76	Peak
2462	96.13	-	-	92.8	32.98	3.64	33.29	100	76	Average
4924	46.73	-27.27	74	40.03	35.19	5.31	33.8	133	295	Peak
7386	48.75	-25.25	74	39.97	36.24	6.7	34.16	166	258	Peak

Test Mode :	2.4GHz 802.11n HT20	Temperature :	22~23°C
Test Channel :	11	Relative Humidity :	42~43%
Test Engineer :	Star Wei	Polarization :	Horizontal
Remark :	1. 2462 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2462	108.74	-	-	105.41	32.98	3.64	33.29	200	134	Peak
2462	96.16	-	-	92.83	32.98	3.64	33.29	200	134	Average
4924	47.04	-26.96	74	40.34	35.19	5.31	33.8	100	0	Peak
7386	49.84	-24.16	74	41.06	36.24	6.7	34.16	120	115	Peak

Test Mode :	2.4GHz 802.11n HT20	Temperature :	22~23°C
Test Channel :	11	Relative Humidity :	42~43%
Test Engineer :	Star Wei	Polarization :	Vertical
Remark :	1. 2462 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2462	105.6	-	-	102.27	32.98	3.64	33.29	200	103	Peak
2462	93.16	-	-	89.83	32.98	3.64	33.29	200	103	Average
4924	45.9	-28.1	74	39.2	35.19	5.31	33.8	133	215	Peak
7386	48.85	-25.15	74	40.07	36.24	6.7	34.16	112	147	Peak

Test Mode :	2.4GHz 802.11n HT40	Temperature :	22~23°C
Test Channel :	09	Relative Humidity :	42~43%
Test Engineer :	Star Wei	Polarization :	Horizontal
Remark :	1. 2452 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2452	104.81	-	-	101.51	32.95	3.63	33.28	200	135	Peak
2452	92.15	-	-	88.85	32.95	3.63	33.28	200	135	Average
4904	46.48	-27.52	74	39.79	35.19	5.3	33.8	100	142	Peak
7356	49.11	-24.89	74	40.38	36.22	6.66	34.15	100	182	Peak

Test Mode :	2.4GHz 802.11n HT40	Temperature :	22~23°C
Test Channel :	09	Relative Humidity :	42~43%
Test Engineer :	Star Wei	Polarization :	Vertical
Remark :	1. 2452 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2452	102.2	-	-	98.9	32.95	3.63	33.28	100	126	Peak
2452	91.25	-	-	87.95	32.95	3.63	33.28	100	126	Average
4904	46.77	-27.23	74	40.08	35.19	5.3	33.8	133	265	Peak
7356	48.84	-25.16	74	40.11	36.22	6.66	34.15	100	145	Peak

Test Mode :	802.11a	Temperature :	22~23°C
Test Channel :	157	Relative Humidity :	42~43%
Test Engineer :	Star Wei	Polarization :	Horizontal
Remark :	1. 5785 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5785	101.7	-	-	94.17	35.53	5.7	33.7	100	3	Peak
5785	90.17	-	-	82.64	35.53	5.7	33.7	100	3	Average
11571	39.38	-34.62	74	26.46	38.14	8.8	34.02	100	145	Peak

Test Mode :	802.11a	Temperature :	22~23°C
Test Channel :	157	Relative Humidity :	42~43%
Test Engineer :	Star Wei	Polarization :	Vertical
Remark :	1. 5785 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5785	101.9	-	-	94.37	35.53	5.7	33.7	100	329	Peak
5785	90.49	-	-	82.96	35.53	5.7	33.7	100	329	Average
11571	38.35	-35.65	74	25.43	38.14	8.8	34.02	100	122	Peak

Test Mode :	5GHz 802.11n HT20	Temperature :	22~23°C
Test Channel :	157	Relative Humidity :	42~43%
Test Engineer :	Star Wei	Polarization :	Horizontal
Remark :	1. 5785 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5785	102.51	-	-	94.98	35.53	5.7	33.7	100	4	Peak
5785	89.98	-	-	82.45	35.53	5.7	33.7	100	4	Average
11571	39.38	-34.62	74	60.22	4.38	8.8	34.02	100	0	Peak

Test Mode :	5GHz 802.11n HT20	Temperature :	22~23°C
Test Channel :	157	Relative Humidity :	42~43%
Test Engineer :	Star Wei	Polarization :	Vertical
Remark :	1. 5785 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5785	102.74	-	-	95.21	35.53	5.7	33.7	100	329	Peak
5785	90.58	-	-	83.05	35.53	5.7	33.7	100	329	Average
11571	38.35	-35.65	74	59.19	4.38	8.8	34.02	112	15	Peak

Test Mode :	5GHz 802.11n HT40	Temperature :	22~23°C
Test Channel :	159	Relative Humidity :	42~43%
Test Engineer :	Star Wei	Polarization :	Horizontal
Remark :	1. 5795 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5795	99.84	-	-	92.28	35.54	5.72	33.7	100	19	Peak
5795	88.12	-	-	80.56	35.54	5.72	33.7	100	19	Average
11590	37.88	-36.12	74	58.79	4.34	8.78	34.03	108	114	Peak

Test Mode :	5GHz 802.11n HT40	Temperature :	22~23°C
Test Channel :	159	Relative Humidity :	42~43%
Test Engineer :	Star Wei	Polarization :	Vertical
Remark :	1. 5795 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5795	100.08	-	-	92.52	35.54	5.72	33.7	100	329	Peak
5795	88.64	-	-	81.08	35.54	5.72	33.7	100	329	Average
11590	37.15	-36.85	74	58.06	4.34	8.78	34.03	133	145	Peak

Test Mode :	5GHz 802.11ac VHT20	Temperature :	22~23°C
Test Channel :	157	Relative Humidity :	42~43%
Test Engineer :	Star Wei	Polarization :	Horizontal
Remark :	1. 5785 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5785	101.79	-	-	94.26	35.53	5.7	33.7	100	18	Peak
5785	90.05	-	-	82.52	35.53	5.7	33.7	100	18	Average
11570	37.48	-36.52	74	58.32	4.38	8.8	34.02	100	200	Peak

Test Mode :	5GHz 802.11ac VHT20	Temperature :	22~23°C
Test Channel :	157	Relative Humidity :	42~43%
Test Engineer :	Star Wei	Polarization :	Vertical
Remark :	1. 5785 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5785	101.78	-	-	94.25	35.53	5.7	33.7	100	333	Peak
5785	89.18	-	-	81.65	35.53	5.7	33.7	100	333	Average
11570	38.65	-35.35	74	59.49	4.38	8.8	34.02	100	248	Peak

Test Mode :	5GHz 802.11ac VHT40	Temperature :	22~23°C
Test Channel :	159	Relative Humidity :	42~43%
Test Engineer :	Star Wei	Polarization :	Horizontal
Remark :	1. 5795 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5795	98.8	-	-	91.24	35.54	5.72	33.7	100	20	Peak
5795	87.68	-	-	80.12	35.54	5.72	33.7	100	20	Average
11590	38.62	-35.38	74	59.53	4.34	8.78	34.03	100	74	Peak

Test Mode :	5GHz 802.11ac VHT40	Temperature :	22~23°C
Test Channel :	159	Relative Humidity :	42~43%
Test Engineer :	Star Wei	Polarization :	Vertical
Remark :	1. 5795 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5795	99.26	-	-	91.7	35.54	5.72	33.7	100	320	Peak
5795	88.78	-	-	81.22	35.54	5.72	33.7	100	320	Average
11591	38.72	-35.28	74	59.63	4.34	8.78	34.03	100	12	Peak

Test Mode :	5GHz 802.11ac VHT80	Temperature :	22~23°C
Test Channel :	155	Relative Humidity :	42~43%
Test Engineer :	Star Wei	Polarization :	Horizontal
Remark :	1. 5775 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5775	96.85	-	-	89.32	35.53	5.7	33.7	100	17	Peak
5775	85.52	-	-	77.99	35.53	5.7	33.7	100	17	Average
11550	39.68	-34.32	74	60.47	4.42	8.81	34.02	120	115	Peak

Test Mode :	5GHz 802.11ac VHT80	Temperature :	22~23°C
Test Channel :	155	Relative Humidity :	42~43%
Test Engineer :	Star Wei	Polarization :	Vertical
Remark :	1. 5775 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5775	96.47	-	-	88.94	35.53	5.7	33.7	100	327	Peak
5775	86.04	-	-	78.51	35.53	5.7	33.7	100	327	Average
11550	38.36	-35.64	74	59.15	4.42	8.81	34.02	100	0	Peak

<Sample 2>

Test Mode :	802.11b	Temperature :	22~23°C
Test Channel :	11	Relative Humidity :	42~43%
Test Engineer :	Star Wei	Polarization :	Horizontal
Remark :	1. 2462 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2462	107.4	-	-	104.07	32.98	3.64	33.29	109	276	Peak
2462	102.4	-	-	99.07	32.98	3.64	33.29	109	276	Average
4924	47.63	-26.37	74	40.93	35.19	5.31	33.8	174	89	Peak
7386	49.17	-24.83	74	40.39	36.24	6.7	34.16	100	154	Peak

Test Mode :	802.11b	Temperature :	22~23°C
Test Channel :	11	Relative Humidity :	42~43%
Test Engineer :	Star Wei	Polarization :	Vertical
Remark :	1. 2462 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2462	104.31	-	-	100.98	32.98	3.64	33.29	100	33	Peak
2462	98.45	-	-	95.12	32.98	3.64	33.29	100	33	Average
4924	47.74	-26.26	74	41.04	35.19	5.31	33.8	114	265	Peak
7386	49	-25	74	40.22	36.24	6.7	34.16	120	32	Peak

<Sample 3>

Test Mode :	802.11b	Temperature :	22~23°C
Test Channel :	11	Relative Humidity :	42~43%
Test Engineer :	Star Wei	Polarization :	Horizontal
Remark :	1. 2462 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2462	105.85	-	-	102.52	32.98	3.64	33.29	112	275	Peak
2462	100.35	-	-	97.02	32.98	3.64	33.29	112	275	Average
4924	47.69	-26.31	74	40.99	35.19	5.31	33.8	100	147	Peak
7386	49.36	-24.64	74	40.58	36.24	6.7	34.16	100	144	Peak

Test Mode :	802.11b	Temperature :	22~23°C
Test Channel :	11	Relative Humidity :	42~43%
Test Engineer :	Star Wei	Polarization :	Vertical
Remark :	1. 2462 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2462	102.6	-	-	99.27	32.98	3.64	33.29	100	54	Peak
2462	97.63	-	-	94.3	32.98	3.64	33.29	100	54	Average
4924	47.8	-26.2	74	41.1	35.19	5.31	33.8	100	215	Peak
7386	49.72	-24.28	74	40.94	36.24	6.7	34.16	100	14	Peak

4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
EMI Test Receiver	R&S	ESCI	100534	9kHz~3GHz	Nov. 05, 2013	Sep. 15, 2014	Nov. 04, 2014	Radiation (03CH01-KS)
Spectrum Analyzer	R&S	FSP30	101399	9kHz~30GHz	May 04, 2014	Sep. 15, 2014	May 03, 2015	Radiation (03CH01-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Oct. 09, 2013	Sep. 15, 2014	Oct. 08, 2014	Radiation (03CH01-KS)
Bilog Antenna	SCHAFFNER	CBL6112D	23182	25MHz~2GHz	Jan. 08, 2014	Sep. 15, 2014	Jan. 07, 2015	Radiation (03CH01-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	75959	1GHz~18GHz	Jan. 08, 2014	Sep. 15, 2014	Jan. 07, 2015	Radiation (03CH01-KS)
Active Horn Antenna	com-power	AHA-118	701030	1GHz~18GHz	Nov. 18, 2013	Sep. 15, 2014	Nov. 17, 2014	Radiation (03CH01-KS)
SHF-EHF Horn	Schwarzbeck	BBHA 9170	BBHA170249	15GHz~40GHz	Mar. 10, 2014	Sep. 15, 2014	Mar. 09, 2015	Radiation (03CH01-KS)
Amplifier	com-power	PA-103A	161073	1MHz~1GHz	May 04, 2014	Sep. 15, 2014	May 03, 2015	Radiation (03CH01-KS)
Amplifier	Agilent	8449B	3008A02371	1GHz~26.5GHz	Dec. 10, 2013	Sep. 15, 2014	Dec. 09, 2014	Radiation (03CH01-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Sep. 15, 2014	NCR	Radiation (03CH01-KS)
Turn Table	MF	MF7802	N/A	0~360 degree	NCR	Sep. 15, 2014	NCR	Radiation (03CH01-KS)
Antenna Mast	MF	MF7802	N/A	1 m~4 m	NCR	Sep. 15, 2014	NCR	Radiation (03CH01-KS)

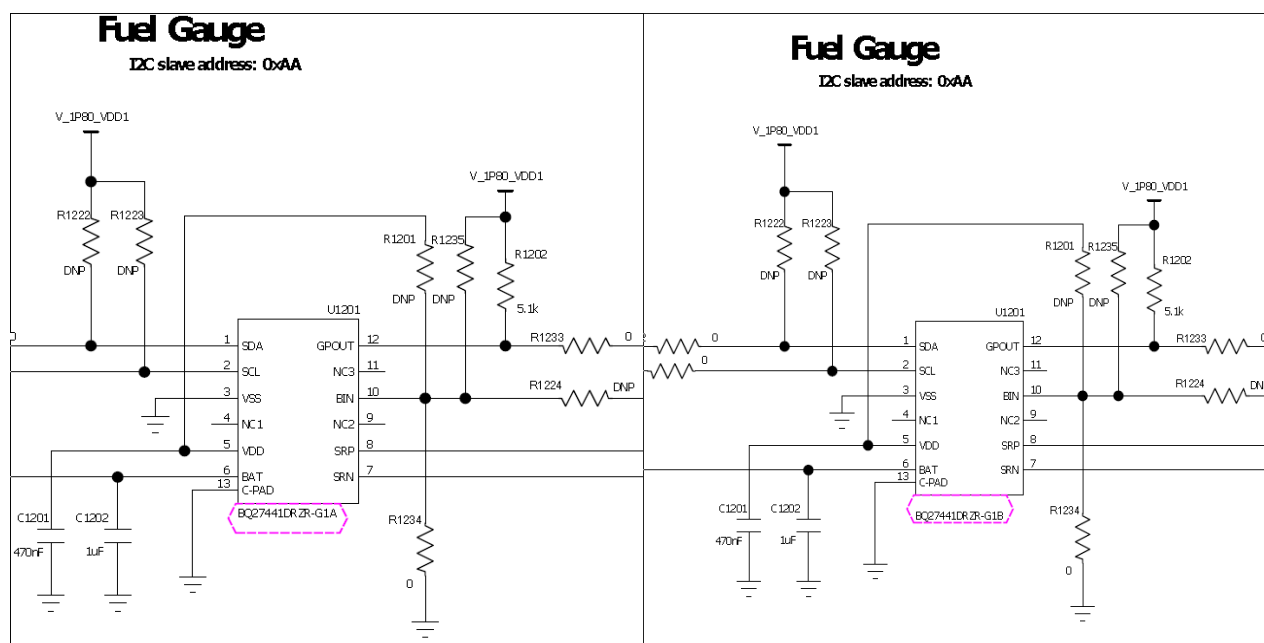
5 Uncertainty of Evaluation

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	2.5
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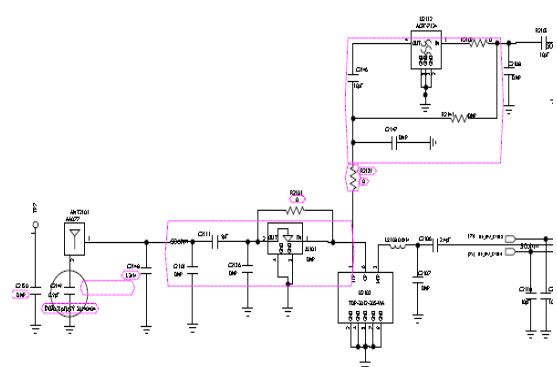


Appendix B. Product Equality Declaration



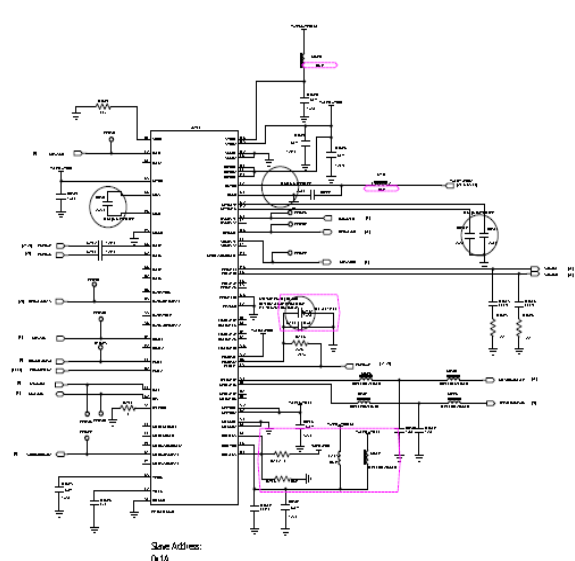
C2149 change from 0402 0.75 PF to 0402 0.9 PF;
C2150 change from 0402 0.5 PF to 0402 DNP;
C2148 change from 0402 9 PF to 0402 1.2NH;
J2101 change from MM8030-2610B/RJ3/RK0 to DNP;
R2101 change from DNP to 0201 0R.

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Add R2457 OR 0201 L2410;
Delete R2456, L2401, L2402 , L2409.

P708-B1-BOT

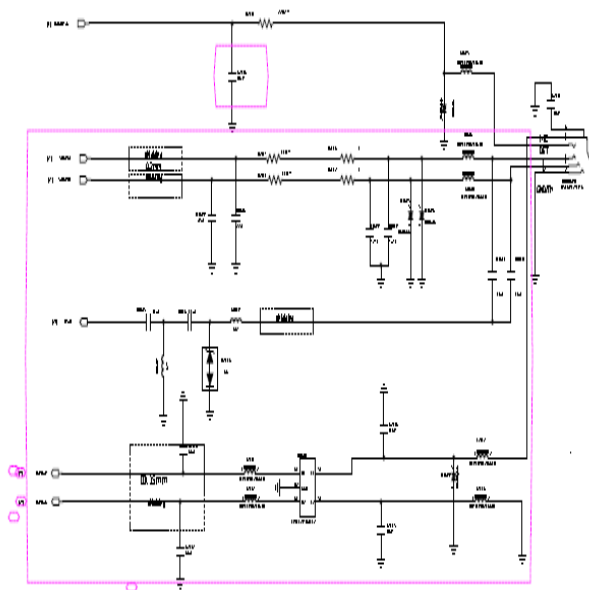


4. Optimization Headset interface circuit.

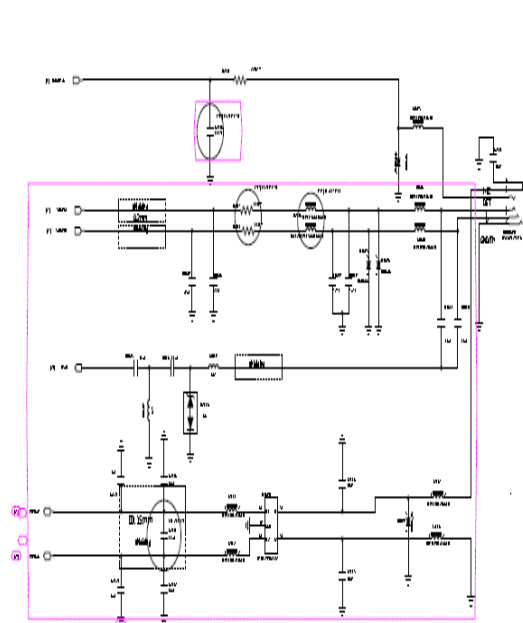
Add C2452 4.7uF 0402;
 R2506 change from 0R 0402 to BLM15AG601SN1D;
 R2507 change from 0R 0402 to BLM15AG601SN1D;
 C2506 change from 0201 DNP to 0201 100nF;
 R2504 change from 10R 0201 to 33R 0201;
 R2505 change from 10R 0201 to 33R 0201;
 Add C2515 33pF 0201.

SCH location:

P708-B1-BOT



B2

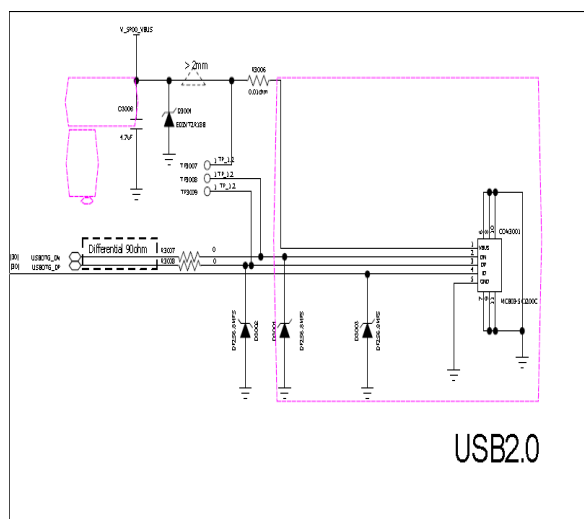


5. Replacing the USB connector.

Connector changed from CON3001 MCB03-5K1200C to 3FU005S-7W200CR007.

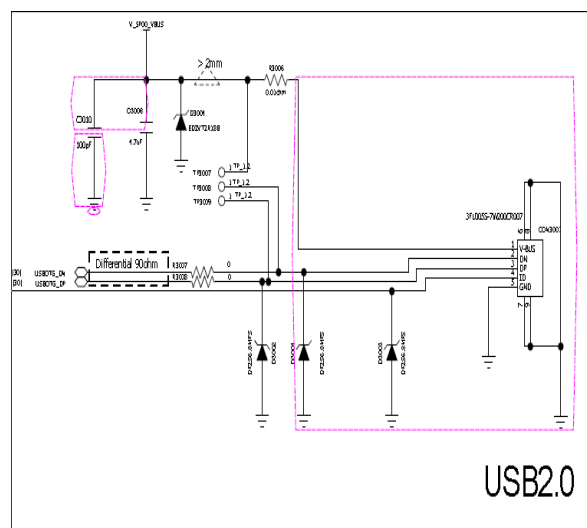
SCH location:

P708-B1-BOT



USB2.0

B2



USB2.0

6. Optimization of LED lamp control circuit.

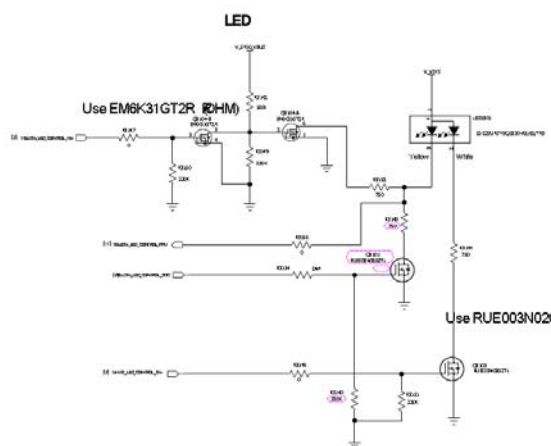
Q3101 change from RUE003N02GZTL to DNP;

R3148 change from 750 R to DNP;

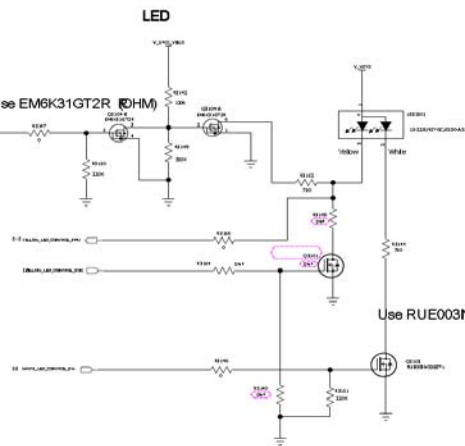
R3140 change from 220K to DNP.

SCH location:

P708-B1-BOT



B2

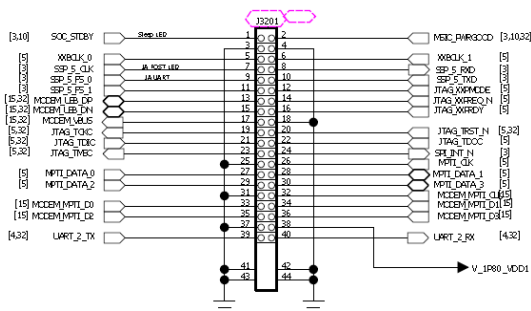


7. Delete Debug connector DNP J3201.

SCH location:

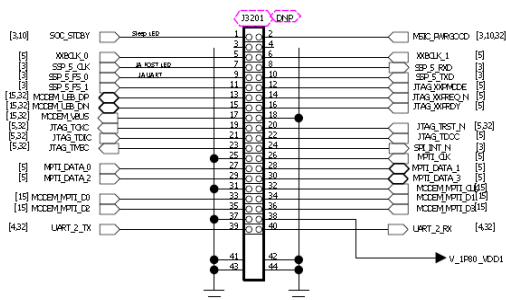
P708-B1-BOT

Debug connector



B2

Debug connector



All of these changes listed above have been applied to the samples used for lab tests.

Contact Person:

Zeli Tao

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