

TEST REPORT



DT&C Co., Ltd.

42, Yurim-ro, 154beon-gil, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea 17042
Tel : 031-321-2664, Fax : 031-321-1664

1. Report No. : DREFCC2106-0104
2. Client / Applicant
 - Name : The Whistler Group, Inc.
 - Address : 168 Ayer Road, Littleton, MA 01460, USA
3. Use of Report : Class II Permissive Change
4. Product Name / Model Name : 200CH Deskto Radio Scanner With FM Radio / WS1025
(FCC ID / IC : HSXSC02 / 1698A-SC02)
5. Test Standard : ANSI C63.4 : 2014
FCC Part 15 Subpart B
(CSR - Scanning Receiver)
RSS-215 Issue 2
6. Date of Test : Apr. 29. 2021
7. Location of Test : ☒ Permanent Testing Lab ☐ On Site Testing
8. Testing Environment : Temperature (21 ~ 24) °C , Humidity (38 ~ 40) % R.H.
9. Test Result : Refer to the attached Test Result

The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
This test report is not related to KOLAS accreditation.

Affirmation	Tested by	Reviewed by
	Name : JunSeo Park 	Name : KyoungHwan Bae 

Jun. 11. 2021

DT&C Co., Ltd.

If this report is required to confirmation of authenticity, please contact to report@dtnc.net

CONTENTS

1. General Remarks	3
2. Test Laboratory	3
3. General Information of EUT.....	4
4. EUT Operations and Test Configurations	5
4.1 Principle of Configuration Selection	5
4.2 EUT Operation Mode	5
4.3 Test Configuration Mode.....	5
4.4 Supported Equipment	6
4.5 EUT In/Output Port	6
4.6 Test Voltage and Frequency	6
5. Test Summary	7
6. Test Environment.....	7
7. Test Results : Emission.....	8
7.1 Conducted Disturbance	8
7.2 Radiated Disturbance	14
8. Revision History.....	34

1. General Remarks

This report contains the result of tests performed by :

DT&C Co., Ltd.

42, Yurim-ro, 154beon-gil, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea 17042

<http://www.dtnc.net>

Tel: +82-31-321-2664 Fax: +82-31-321-1664

2. Test Laboratory

DT&C Co., Ltd. has been accredited / filed / authorized by the agencies listed in the following table;

Certificate	Nation	Agency	Code	Remark
Accreditation	Korea	KOLAS	393	ISO/IEC 17025
	South Africa	SABS	0006	ISO/IEC 17025
	Ghana	NCA	NCA agreement 23rd,Oct,2018	-
	USA	FCC	KR0034	Designation
	Canada	IC	KR0034	Designation
Site Filing	Japan	VCCI	C-1427, R-3385, R-14076, R-14180, R-14496, T-11442, G-10338, G-10754, G-10815, G-20051	Registered
Certification	Korea	KC	KR0034	Designation
	Germany	TUV	CARAT 089112 0008 Rev.00	ISO/IEC 17025
	Russia	RMRS	17.10189.296	ISO/IEC 17025

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

3. General Information of EUT

Applicant	The Whistler Group, Inc. 168 Ayer Road, Littleton, MA 01460, USA
Manufacturer	RDX, Inc 1106 Daeryung Techno Twon 8, 96 Gamasanro, Guemcheon-gu, Seoul, Korea
Factory	Radix Telecom Phils., Industries Inc. Sunpino BLDG, Block 6 Lot 10, Phase II CEZ Rosario Cabite 4106 Philippines
Product Name	200CH Deskto Radio Scanner With FM Radio
Model Name (FCC, IC)	WS1025
Add Model Name (FCC)	PRO-650
Add Model Name (IC)	None
PMN(IC)	WS1025
Add Model Difference	Case color Difference
H/W version	None
S/W version	None
Maximum Internal Frequency	501.3 MHz
Rated Power	100-240 V, 50/60 Hz
FCC ID	HSXSC02
IC	1698A-SC02
Remarks	None

Related Submittal(s) / Grant(s)
Original submittal only

4. EUT Operations and Test Configurations

4.1 Principle of Configuration Selection

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. For each testing mode different configurations were used, Refer to the individual tests.

4.2 EUT Operation Mode

No.	Mode	Description
1	SCAN	The EUT was set to constantly scan all bands.
2	PC/IF	The EUT was set to connect PC/IF cable to the scanning receiver for receiving data and status.

4.3 Test Configuration Mode

No.	Mode	Description
1	SCAN	EUT is connected Ear mic EUT is connected AC adaptor
2	PC/IF	EUT is connected Ear mic EUT is connected PC/IF Cable EUT is connected AC adaptor

4.4 Supported Equipment

Used*	Product Type	Manufacturer	Model	Remarks
AE	Ear mic	N/A	N/A	N/A
*Abbreviations: AE - Auxiliary/Associated Equipment, or SIM - Simulator				

4.5 EUT In/Output Port

Name	Type*	Cable Max. >3 m	Cable Shielded	Cable Back shell	Remarks
AUDIO	I/O	1.5	Non shield	Plastic	N/A
PC/IF	I/O	1.5	Shield	Plastic	N/A
ANT	I/O	-	Shield	Plastic	N/A
ANT	I/O	-	Shield	Plastic	N/A
*Abbreviations: AC = AC Power Port DC = DC Power Port N/E = Non-Electrical I/O = Signal Input or Output Port TP = Telecommunication Ports					

4.6 Test Voltage and Frequency

Case	Voltage (V)	Frequency (Hz)	Phases	Remarks
1	AC 120	60	Single	None

5. Test Summary

Test Items	Applied Standards	Results	U (k = 2)
Conducted Disturbance	ANSI C63.4 : 2014 RSS-215 Issue 2	C	Mains : 3.4 dB
Radiated Disturbance	ANSI C63.4 : 2014 RSS-215 Issue 2	C	Below 1 GHz : 4.64 dB Above 1 GHz : 6.42 dB
Antenna Power Conduction	ANSI C63.4 : 2014	C	-
C=Comply N/C=Not Comply N/T=Not Tested N/A=Not Applicable			

The data in this test report are traceable to the national or international standards.

-Conducted Disturbance

Frequency [MHz]	Phase	Result [dB μ V]	Detector	Limit [dB μ V]	Margin [dB]
0.42718	N	35.41	Cispr - Average	47.31	11.90

-Radiated Disturbance

Frequency [MHz]	Pol.	Result [dB μ V/m]	Detector	Limit [dB μ V/m]	Margin [dB]
128.002	V	27.75	Quasi - Peak	43.50	15.75

- Antenna Power Conduction

Frequency [MHz]	Result [dB μ V/m]	Detector	Limit [dB μ V/m]	Margin [dB]
952.470	28.50	Quasi - Peak	51.70	19.51

6. Test Environment

Test Items	Test date (YYYY-MM-DD)	Temp. (°C)	Humidity (% R.H.)	Pressure (kPa)
Conducted Disturbance	2021-04-29	24	38	100.2
Radiated Disturbance	2021-04-29	23	40	-
Antenna Power Conduction	2021-04-29	21	40	100.2

7. Test Results : Emission

7.1 Conducted Disturbance

ANSI C63.4, RSS-215 Issue 2	Mains terminal disturbance voltage		Result	
<u>Method:</u> The AMN placed 0,8 m from the boundary of the unit under test and bonded to a ground reference plane. This distance was between the closest points of the AMN and the EUT. All other units of the EUT and associated equipment were at least 0,8 m from the AMN. All power was connected to the system through Artificial Mains Network (AMN). Conducted voltage measurements on mains lines were made at the output of the AMN. The measuring port of the LISN for EUT was connected to spectrum analyzer. Using conducted emission test software, the emissions were scanned with peak detector mode. After scanning over the frequency range, suspected emissions were selected to perform final measurement. When performing final measurement, the receiver was used which has Quasi-Peak detector and CISPR Average detector. For (0.15 ~ 30) MHz frequency range, Quasi-Peak detector with 10 kHz RBW and 30 kHz VBW was used. By varying the configuration of the test sample and the cable routing it was attempted to maximize the emission.			Comply	
Fully configured sample scanned over the following frequency range	Frequency range on each side of line	Measurement Point		
	150 kHz to 30 MHz	Mains		
EUT mode (Refer to clauses 4)	Test configuration mode	1, 2		
	EUT Operation mode	1, 2		
Limits – Class A				
Frequency (MHz)	Limit dBµV			
	Quasi-Peak	Average		
0.15 to 0.50	79	66		
0.50 to 30	73	60		
Limits – Class B				
Frequency (MHz)	Limit dBµV			
	Quasi-Peak	Average		
0.15 to 0.50	66 to 56	56 to 46		
0.50 to 5	56	46		
5 to 30	60	50		

Measurement Instrument					
Description	Model	Manufacturer	Identifier	Cal. Date	Cal. Due
MEASUREMENT SOFTWARE	EMI-C VER. 2.00.0171	TSJ	N/A	N/A	N/A
EMI TEST RECEIVER	ESR7	ROHDE&SCHWARZ	101061	2021-01-28	2022-01-28
TRANSIENT LIMITER	TL-B0930A	EMCIS	11002	2020-08-31	2021-08-31
TWO-LINE V-NETWORK	ENV216	ROHDE&SCHWARZ	101979	2020-12-04	2021-12-04
LISN	LISN1600	TTI	197204	2020-06-03	2021-06-03
TERMINATION	CT-01	TME	N/A	2020-12-14	2021-12-14

Calculation

N : Neutral phase, L1 : Live phase
C.FACTOR(dB) : Pulse Limiter(dB) + Cable loss(dB) + Insertion loss of LISN(dB)
Result(dBμV) : Reading Value(dBμV) + C.FACTOR(dB)
Margin(dB) : Limit(dBμV) - Result(dBμV)

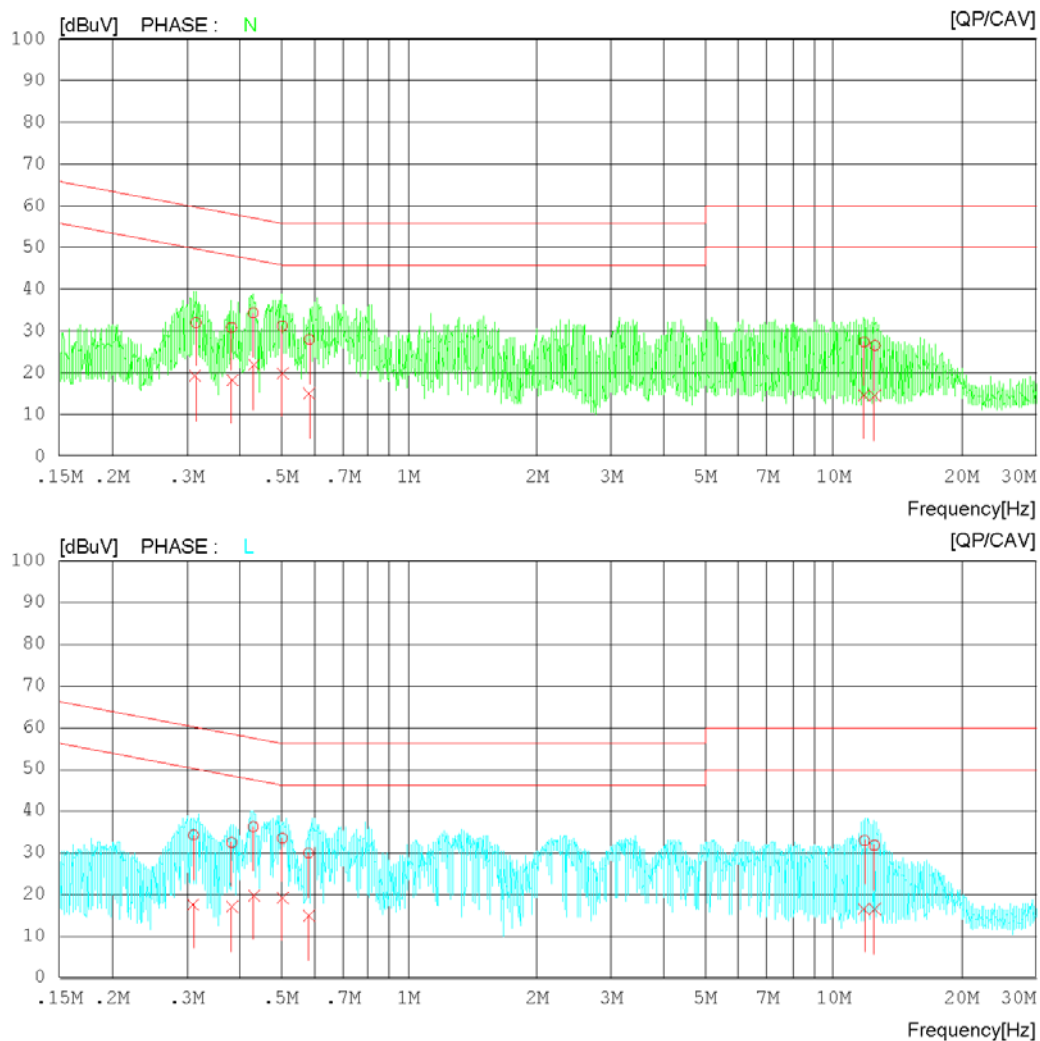
Mains terminal disturbance voltage _ Measurement data			
Test configuration mode	1	EUT Operation mode	1
Test voltage (V)	AC 120	Test Frequency (Hz)	60

Results of Conducted Emission

DT&C
Date 2021-04-29

Order No. DTNC2104-02591
Power Supply 120 V 60 Hz
Temp/Humi/Atm 24 °C 38 % R.H. 100.2 kPa
Test Condition SCAN

Memo

LIMIT : CLASS B_QP
CLASS B_AV


Results of Conducted Emission

DT&C
Date 2021-04-29

Order No. DTNC2104-02591
Power Supply 120 V 60 Hz
Temp/Humi/Atm 24 'C 38 % R.H. 100.2 kPa
Test Condition SCAN

Memo

LIMIT : CLASS B_QP
CLASS B_AV

NO	FREQ [MHz]	READING		C.FACTOR [dB]	RESULT		LIMIT		MARGIN		PHASE
		QP [dBuV]	CAV [dBuV]		QP [dBuV]	CAV [dBuV]	QP [dBuV]	CAV [dBuV]	QP [dBuV]	CAV [dBuV]	
1	0.31528	11.87	-0.90	20.13	32.00	19.23	59.83	49.83	27.83	30.60	N
2	0.38209	10.65	-1.87	20.20	30.85	18.33	58.23	48.23	27.38	29.90	N
3	0.43050	14.14	1.46	20.21	34.35	21.67	57.24	47.24	22.89	25.57	N
4	0.50376	11.01	-0.39	20.21	31.22	19.82	56.00	46.00	24.78	26.18	N
5	0.58350	7.77	-5.17	20.21	27.98	15.04	56.00	46.00	28.02	30.96	N
6	11.82653	6.44	-6.21	20.95	27.39	14.74	60.00	50.00	32.61	35.26	N
7	12.54195	5.53	-6.61	20.98	26.51	14.37	60.00	50.00	33.49	35.63	N
8	0.31105	14.00	-2.58	20.12	34.12	17.54	59.94	49.94	25.82	32.40	L
9	0.38274	12.11	-3.42	20.27	32.38	16.85	58.22	48.22	25.84	31.37	L
10	0.43050	15.84	-0.55	20.31	36.15	19.76	57.24	47.24	21.09	27.48	L
11	0.50436	13.02	-1.15	20.31	33.33	19.16	56.00	46.00	22.67	26.84	L
12	0.58126	9.61	-5.63	20.23	29.84	14.60	56.00	46.00	26.16	31.40	L
13	11.86155	11.83	-4.41	20.95	32.78	16.54	60.00	50.00	27.22	33.46	L
14	12.49824	10.65	-4.79	20.98	31.63	16.19	60.00	50.00	28.37	33.81	L

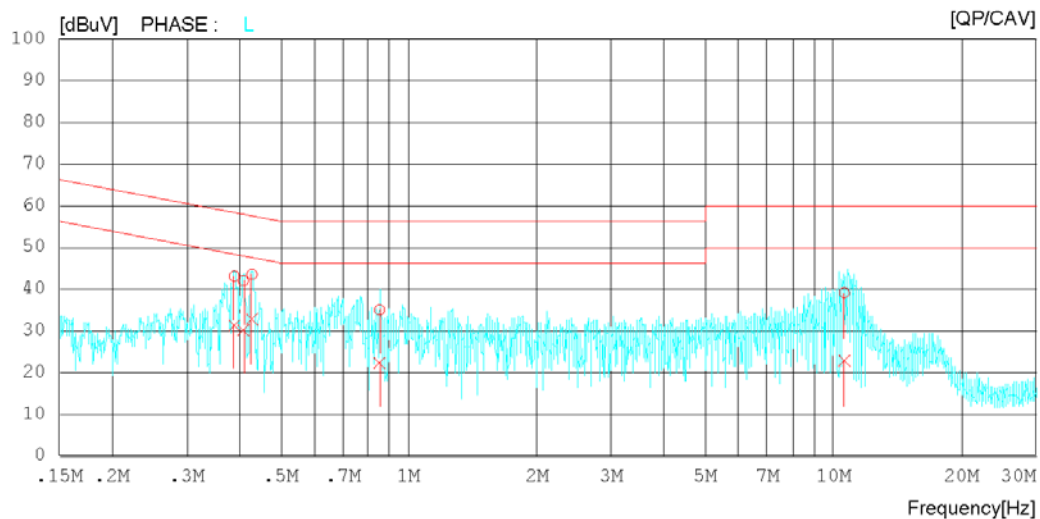
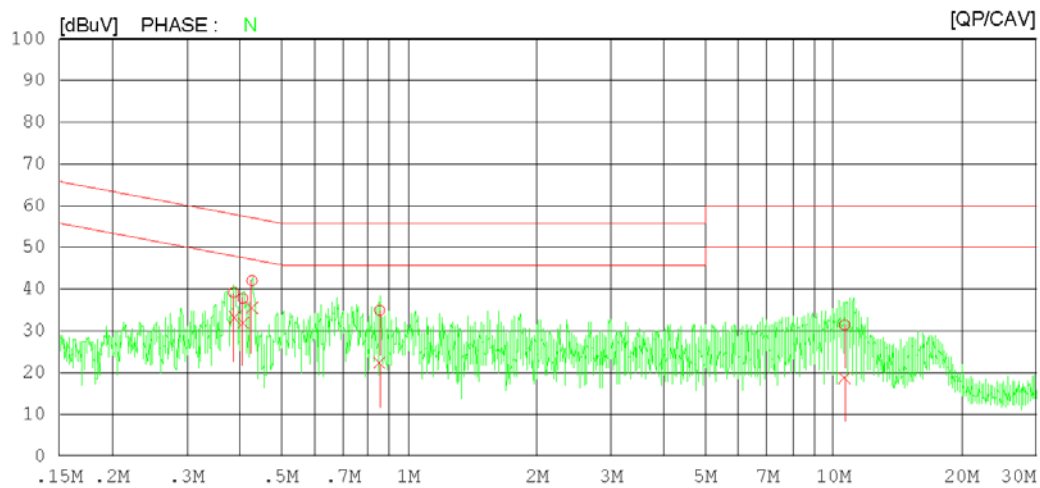
Mains terminal disturbance voltage _ Measurement data			
Test configuration mode	2	EUT Operation mode	2
Test voltage (V)	AC 120	Test Frequency (Hz)	60

Results of Conducted Emission

DT&C
Date 2021-04-29

Order No. DTNC2104-02591
Power Supply 120 V 60 Hz
Temp/Humi/Atm 24 'C 38 % R.H. 100.2 kPa
Test Condition PC/IF

Memo

LIMIT : CLASS B_QP
CLASS B_AV


Results of Conducted Emission

DT&C
Date 2021-04-29

Order No. DTNC2104-02591
Power Supply 120 V 60 Hz
Temp/Humi/Atm 24 'C 38 % R.H. 100.2 kPa
Test Condition PC/IF

Memo

LIMIT : CLASS B_QP
CLASS B_AV

NO	FREQ [MHz]	READING		C.FACTOR [dB]	RESULT		LIMIT		MARGIN		PHASE
		QP [dBuV]	CAV [dBuV]		QP [dBuV]	CAV [dBuV]	QP [dBuV]	CAV [dBuV]	QP [dBuV]	CAV [dBuV]	
1	0.38674	19.02	13.00	20.20	39.22	33.20	58.13	48.13	18.91	14.93	N
2	0.40653	17.60	11.83	20.20	37.80	32.03	57.72	47.72	19.92	15.69	N
3	0.42718	21.86	15.20	20.21	42.07	35.41	57.31	47.31	15.24	11.90	N
4	0.85350	14.88	2.31	20.12	35.00	22.43	56.00	46.00	21.00	23.57	N
5	10.64212	10.51	-2.03	20.90	31.41	18.87	60.00	50.00	28.59	31.13	N
6	0.38841	22.65	10.90	20.28	42.93	31.18	58.10	48.10	15.17	16.92	L
7	0.40780	21.56	9.95	20.30	41.86	30.25	57.69	47.69	15.83	17.44	L
8	0.42693	23.09	12.24	20.31	43.40	32.55	57.31	47.31	13.91	14.76	L
9	0.85366	14.73	2.06	20.17	34.90	22.23	56.00	46.00	21.10	23.77	L
10	10.62735	18.03	1.79	20.90	38.93	22.69	60.00	50.00	21.07	27.31	L

7.2 Radiated Disturbance

ANSI C63.4, RSS-215 Issue 2	Radiated disturbance 30 MHz –30 GHz**			Result
Method: Preliminary (peak) measurements were performed at an antenna to EUT separation distance of 10 or 3 meter below 1GHz and 3 meter above 1GHz. The EUT was rotated 360° about its azimuth with the receive antenna located at various heights in horizontal and vertical polarities. Final measurements were then performed by rotating the EUT 360° and adjusting the receive antenna height from 1 to 4 m. All frequencies were investigated in both horizontal and vertical antenna polarity, where applicable. For final measurement below 1 GHz frequency range, Quasi-Peak detector with (RBW = 120 kHz Bandwidth) was used. For final measurement above 1 GHz frequency range, Peak detector with (RBW = 1 MHz Bandwidth) and CISPR Average detector with (RBW = 1 MHz Bandwidth) were used.				Comply
EUT mode (Refer to clauses 4)	Test configuration mode		1, 2	
	EUT Operation mode		1, 2	
Radiated Disturbance below 1 000 MHz				
Frequency range (MHz)	Quasi-peak limit dBµV/m			
	Class A		Class B	
	3 m distance	10 m distance	3 m distance	
30 to 88	49.1	39.1	40	
88 to 216	53.5	43.5	43.5	
216 to 960	56.4	46.4	46	
960 to 1 000	59.5	49.5	54	
According to 15.109(g), as an alternative to the radiated emission limit shown above, digital devices may be shown to comply with the standards contained in Third Edition of the International Special Committee on Radio Interference (CISPR), Pub. 22 shown.				
Frequency range (MHz)	Quasi-peak limit dBµV/m			
	Class A (10 m distance)		Class B (10 m distance)	
30 to 230	40		30	
230 to 1 000	47		37	
Radiated Disturbance for above 1 000 MHz at a measurement distance of 3 m				
Frequency range (GHz)	Peak limit dBµV/m		Average limit dBµV/m	
	Class A	Class B	Class A	Class B
1 to 40	80	74	60	54
The test frequency range of Radiated Disturbance measurements are listed below.				
Highest frequency generated or used in the device or on which the device operates or tunes (MHz)		Upper frequency of measurement range (MHz)		
Below 108		1 000		
108 – 500		2 000		
500 – 1 000		5 000		
Above 1 000		5 th harmonic of the highest frequency or 40 GHz, whichever is lower		

Measurement Instrument					
Description	Model	Manufacturer	Identifier	Cal. Date	Cal. Due
MEASUREMENT SOFTWARE	EMI-R VER. 2.00.0177	TSJ	N/A	N/A	N/A
EMI TEST RECEIVER	ESU40	ROHDE&SCHWARZ	100525	2020-12-14	2021-12-14
TRILOG BROAD BAND ANTENNA	VULB9160	SCHWARZBECK	9160-3339	2020-10-05	2022-10-05
6 DB ATTENUATOR	2708A	HP	18403	2020-10-05	2022-10-05
LOW NOISE PRE AMPLIFIER	MLA-100K01-B01-26	TSJ	1252741	2021-02-08	2022-02-08
HORN ANTENNA	BBHA 9120D	SCHWARZBECK	9120D-1828	2020-10-21	2021-10-21
PRE AMPLIFIER	8449B	H.P	3008A00887	2020-08-31	2021-08-31
(NOTE : THE MEASUREMENT ANTENNAS WERE CALIBRATED IN ACCORDANCE TO THE REQUIREMENTS OF C63.5-2017.)					

Calculation

Result(dBuV/m) : Reading Value(dBuV) + Cable loss(dB) - Pre amplifier gain(dB) + Ant. Factor(dB)
Margin : Limit(dBuV/m) - Result(dBuV/m)

Radiated disturbance at (30 ~ 1000) MHz _Measurement data			
Test configuration mode	1	EUT Operation mode	1
Test voltage (V)	AC 120	Test Frequency (Hz)	60
FCC Part 15 Subpart B			

RADIATED EMISSION

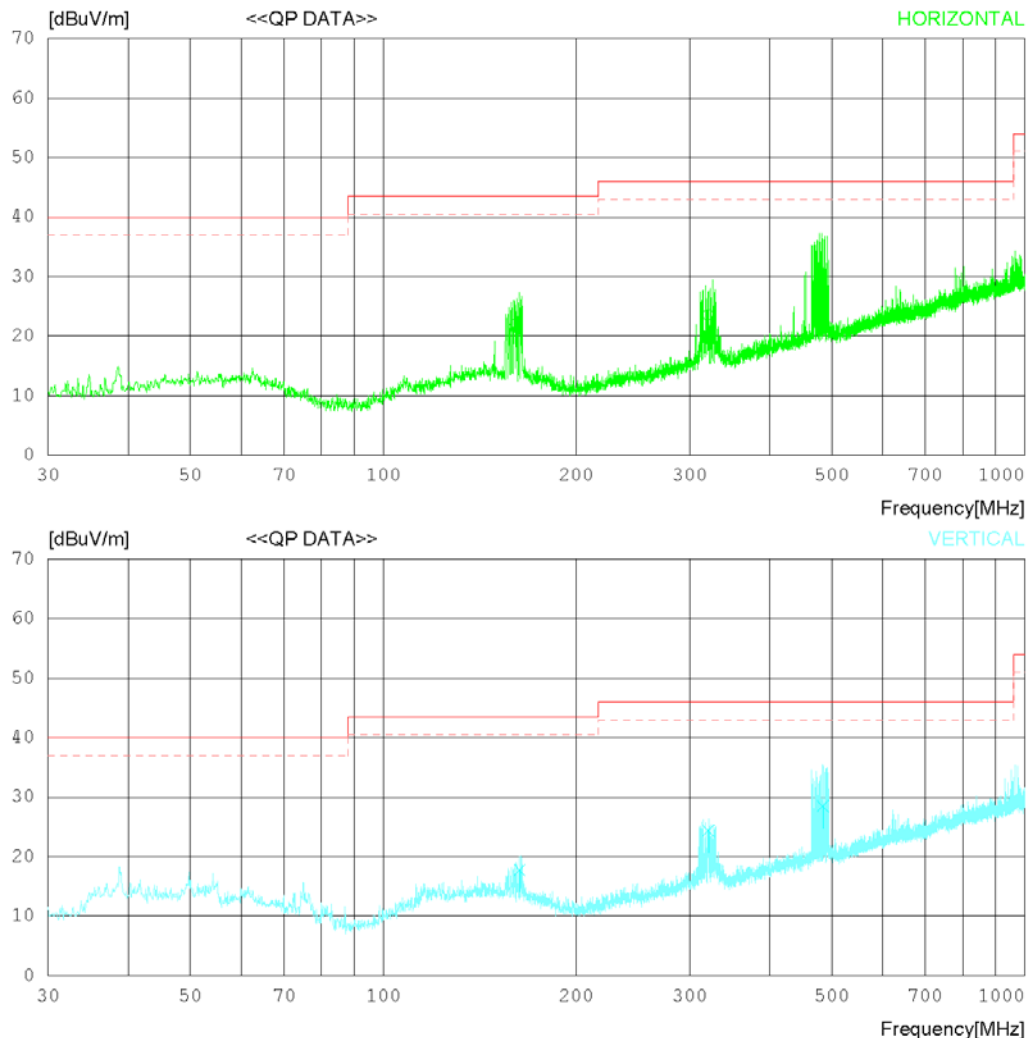
Date 2021-04-29

Order No. DTNC2104-02591
Power Supply 120 V 60 Hz
Temp/Humi 23 °C 40 % R.H.
Test Condition SCAN

Memo

LIMIT : FCC Part15 Subpart.B Class B (3m)
MARGIN: 3 dB

Antenna Factor
1. EMC-228_VULB9160_9160-3339_with ATT_18403_2020.10.05
Cable Loss
1. #24_C1_ANT to BOTTOM_3m_창의_9K-1G_2021-02-19
2. #25_C2_Amp to BOTTOM_3m_창의_9K-1G_2021-02-19
3. #26_C3_Amp to Receiver_3m_창의_9K-1G_2021-02-19
Pre Amp Gain
1. EMC-110_AMP_MLA-100K01-B01-26_1252741_2021.02.08



RADIATED EMISSION

Date 2021-04-29

Order No. DTNC2104-02591
Power Supply 120 V 60 Hz
Temp/Humi 23 °C 40 % R.H.
Test Condition SCAN

Memo

LIMIT : FCC Part15 Subpart B Class B (3m)
MARGIN: 3 dB

Antenna Factor

1. EMC-228_VULB9160_9160-3339_with ATT_18403_2020.10.05

Cable Loss

1. #24_C1_ANT to BOTTOM_3m_창의_9K-1G_2021-02-19

2. #25_C2_Amp to BOTTOM_3m_창의_9K-1G_2021-02-19

3. #26_C3_Amp to Receiver_3m_창의_9K-1G_2021-02-19

Pre Amp Gain

1. EMC-110_AMP_MLA-100K01-B01-26_1252741_2021.02.08

No.	FREQ [MHz]	READING QP [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- HORIZONTAL -----										
1	160.442	28.20	18.76	1.72	26.73	21.95	43.50	21.55	113	78
2	320.532	27.70	19.81	2.59	26.54	23.56	46.00	22.44	202	102
3	486.677	24.60	23.73	3.23	26.32	25.24	46.00	20.76	332	0
----- VERTICAL -----										
4	163.104	24.10	18.70	1.73	26.73	17.80	43.50	25.70	122	56
5	321.182	28.50	19.82	2.60	26.53	24.39	46.00	21.61	202	135
6	484.295	27.90	23.70	3.22	26.32	28.50	46.00	17.50	134	343

Radiated disturbance at (30 ~ 1000) MHz _Measurement data			
Test configuration mode	1	EUT Operation mode	1
Test voltage (V)	AC 120	Test Frequency (Hz)	60
RSS-215 Issue 2			

RADIATED EMISSION

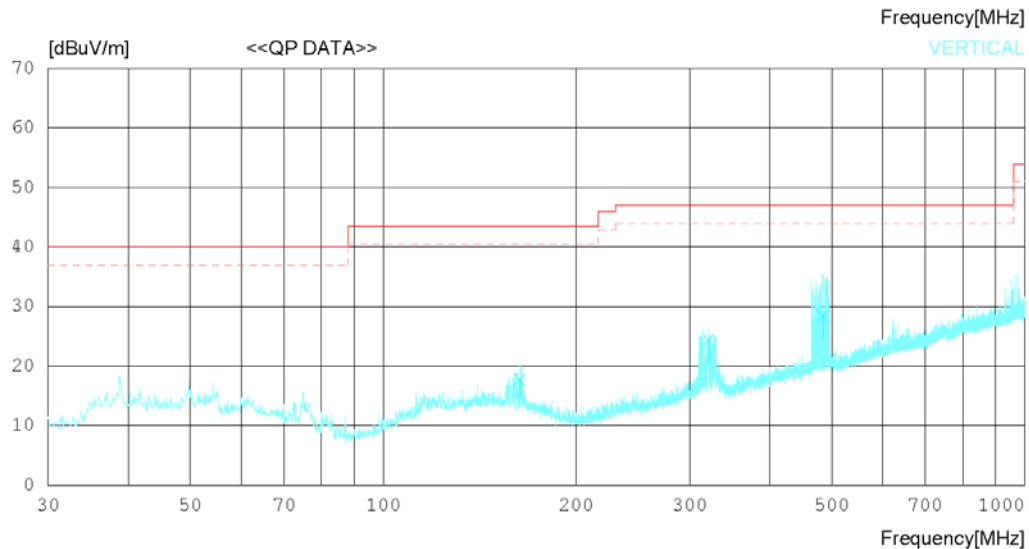
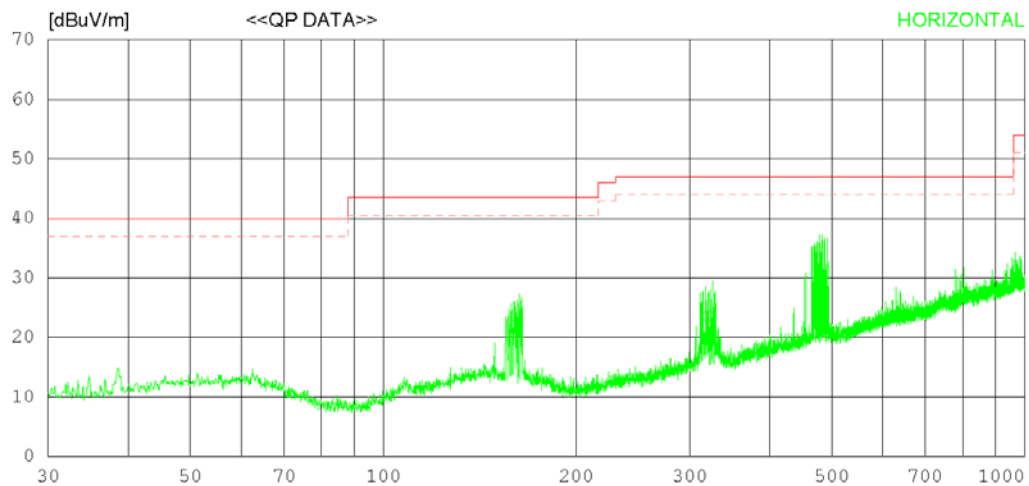
Date 2021-04-29

Order No. DTNC2104-02593
Power Supply 120 V 60 Hz
Temp/Humi 23 'C 40 % R.H.
Test Condition SCAN

Memo

LIMIT : ICES-003 Issue 7 _Class B
MARGIN: 3 dB

Antenna Factor
1. EMC-228_VULB9160_9160-3339_with ATT_18403_2020.10.05
Cable Loss
1. #24_C1_ANT to BOTTOM_3m_창의_9K-1G_2021-02-19
2. #25_C2_Amp to BOTTOM_3m_창의_9K-1G_2021-02-19
3. #26_C3_Amp to Receiver_3m_창의_9K-1G_2021-02-19
Pre Amp Gain
1. EMC-110_AMP_MLA-100K01-B01-26_1252741_2021.02.08



RADIATED EMISSION

Date 2021-04-29

Order No. DTNC2104-02593
Power Supply 120 V 60 Hz
Temp/Humi 23 °C 40 % R.H.
Test Condition SCAN

Memo

LIMIT : ICES-003 Issue 7_Class B
MARGIN: 3 dB

Antenna Factor
1. EMC-228_VULB9160_9160-3339_with ATT_18403_2020.10.05
Cable Loss
1. #24_C1_ANT to BOTTOM_3m_창의_9K-1G_2021-02-19
2. #25_C2_Amp to BOTTOM_3m_창의_9K-1G_2021-02-19
3. #26_C3_Amp to Receiver_3m_창의_9K-1G_2021-02-19
Pre Amp Gain
1. EMC-110_AMP_MLA-100K01-B01-26_1252741_2021.02.08

No.	FREQ [MHz]	READING QP [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- HORIZONTAL -----										
1	160.442	28.20	18.76	1.72	26.73	21.95	43.50	21.55	113	78
2	320.532	27.70	19.81	2.59	26.54	23.56	47.00	23.44	202	102
3	486.677	24.60	23.73	3.23	26.32	25.24	47.00	21.76	332	0
----- VERTICAL -----										
4	163.104	24.10	18.70	1.73	26.73	17.80	43.50	25.70	122	56
5	321.182	28.50	19.82	2.60	26.53	24.39	47.00	22.61	202	135
6	484.295	27.90	23.70	3.22	26.32	28.50	47.00	18.50	134	343

Radiated disturbance at (1 ~ 6) GHz _Peak Measurement data			
Test configuration mode	1	EUT Operation mode	1
Test voltage (V)	AC 120	Test Frequency (Hz)	60

RADIATED EMISSION

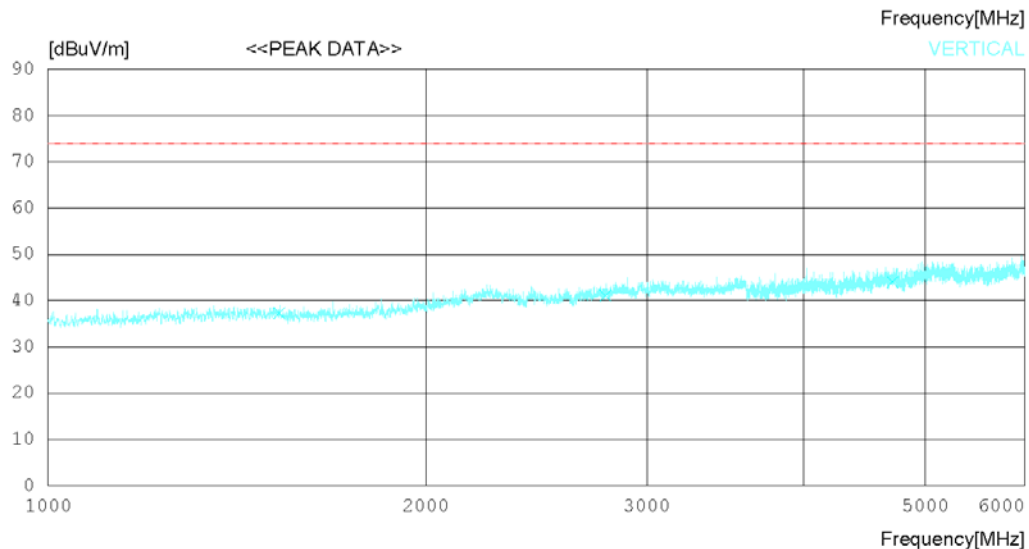
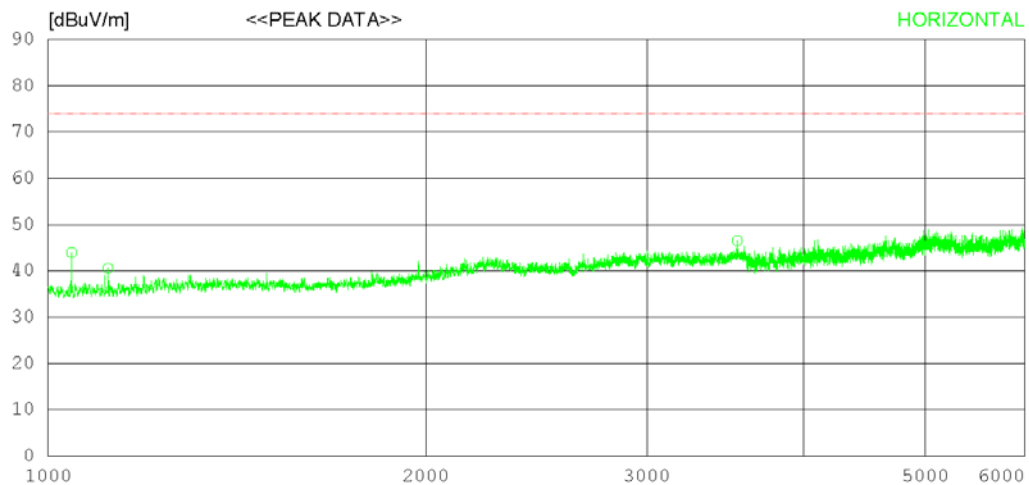
Date 2021-04-29

Order No. DTNC2104-02591
Power Supply 120 V 60 Hz
Temp/Humi 23 'C 40 % R.H.
Test Condition Scan

Memo

LIMIT : FCC Part15 Subpart.B Class B (3m) - GHz(Peak)
FCC Part15 Subpart.B Class B (3m) - GHz(Peak)

Antenna Factor
1. ANT_9120D_1828_20.10.21
Cable Loss
1. #27_C1_Ant to Bottom_3m_창의_1-18G_2021.02.25
2. #28_C2_Bottom to Amp(Filter,Receiver)_3m_창의_1-18G_2021.02.25
3. #29_C3_Amp to Receiver_3m_창의_1-18G_2021.02.25
Pre Amp Gain
1. AMP_8449B_3008A00887_2020.08.31



RADIATED EMISSION

Date 2021-04-29

Order No. DTNC2104-02591
Power Supply 120 V 60 Hz
Temp/Humi 23 °C 40 % R.H.
Test Condition Scan

Memo

LIMIT : FCC Part15 Subpart B Class B (3m) - GHz(Peak)
FCC Part15 Subpart B Class B (3m) - GHz(Peak)

Antenna Factor

1. ANT_9120D_1828_20.10.21

Cable Loss

1. #27_C1_Ant to Bottom_3m_참의_1-18G_2021.02.25

2. #28_C2_Bottom to Amp(Filter,Receiver)_3m_참의_1-18G_2021.02.25

3. #29_C3_Amp to Receiver_3m_참의_1-18G_2021.02.25

Pre Amp Gain

1. AMP_8449B_3008A00887_2020.08.31

No.	FREQ [MHz]	READING PEAK [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- HORIZONTAL -----										
1	1043.750	51.30	24.79	4.01	36.15	43.95	74.0	30.05	123	126
2	1116.250	47.70	24.80	4.18	36.07	40.61	74.0	33.39	305	358
3	3540.625	44.60	28.88	7.99	34.93	46.54	74.0	27.46	121	28
----- VERTICAL -----										
4	1528.750	42.50	25.37	5.05	35.62	37.30	74.0	36.7	113	165
5	2780.625	40.80	28.06	7.33	35.18	41.01	74.0	32.99	230	0
6	4710.000	38.10	31.10	9.80	34.98	44.02	74.0	29.98	305	169

Radiated disturbance at (1 ~ 6) GHz _ Average Measurement data			
Test configuration mode	1	EUT Operation mode	1
Test voltage (V)	AC 120	Test Frequency (Hz)	60

RADIATED EMISSION

Date 2021-04-29

Order No. DTNC2104-02591
 Power Supply 120 V 60 Hz
 Temp/Humi 23 'C 40 % R.H.
 Test Condition Scan

Memo

LIMIT : FCC Part15 Subpart.B Class B (3m) - GHz(Average)
 FCC Part15 Subpart.B Class B (3m) - GHz(Average)

Antenna Factor

1. ANT_9120D_1828_20.10.21

Cable Loss

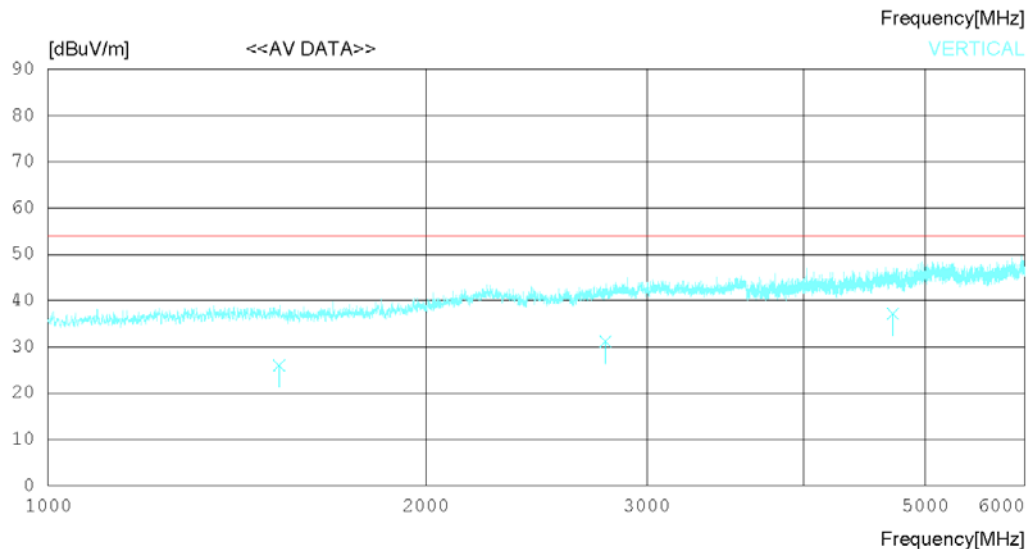
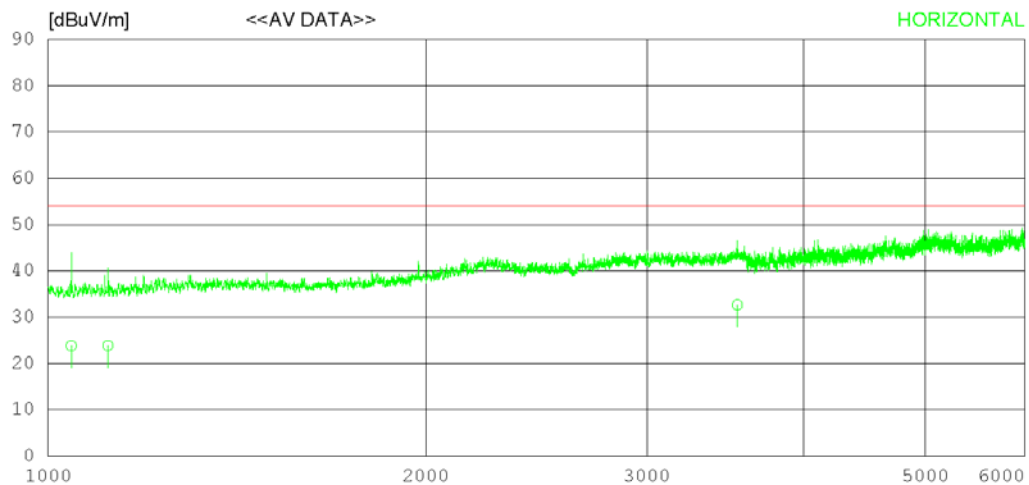
1. #27_C1_Ant to Bottom_3m_창의_1-18G_2021.02.25

2. #28_C2_Bottom to Amp(Filter,Receiver)_3m_창의_1-18G_2021.02.25

3. #29_C3_Amp to Receiver_3m_창의_1-18G_2021.02.25

Pre Amp Gain

1. AMP_8449B_3008A00887_2020.08.31



RADIATED EMISSION

Date 2021-04-29

Order No. DTNC2104-02591
Power Supply 120 V 60 Hz
Temp/Humi 23 °C 40 % R.H.
Test Condition Scan

Memo

LIMIT : FCC Part15 Subpart B Class B (3m) - GHz(Average)
FCC Part15 Subpart B Class B (3m) - GHz(Average)

Antenna Factor

1. ANT_9120D_1828_20.10.21

Cable Loss

1. #27_C1_Ant to Bottom_3m_창의_1-18G_2021.02.25

2. #28_C2_Bottom to Amp(Filter,Receiver)_3m_창의_1-18G_2021.02.25

3. #29_C3_Amp to Receiver_3m_창의_1-18G_2021.02.25

Pre Amp Gain

1. AMP_8449B_3008A00887_2020.08.31

No.	FREQ [MHz]	READING CAV [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- HORIZONTAL -----										
1	1043.413	31.20	24.79	4.01	36.15	23.85	54.00	30.15	301	78
2	1116.211	30.98	24.80	4.18	36.07	23.89	54.00	30.11	112	220
3	3540.473	30.71	28.88	7.99	34.93	32.65	54.00	21.35	305	331
----- VERTICAL -----										
4	1528.133	31.20	25.37	5.05	35.62	26.00	54.00	28.00	230	78
5	2780.624	30.92	28.06	7.33	35.18	31.13	54.00	22.87	223	110
6	4710.131	31.22	31.10	9.80	34.98	37.14	54.00	16.86	131	223

Radiated disturbance at (30 ~ 1000) MHz _Measurement data			
Test configuration mode	2	EUT Operation mode	2
Test voltage (V)	AC 120	Test Frequency (Hz)	60
FCC Part 15 Subpart B			

RADIATED EMISSION

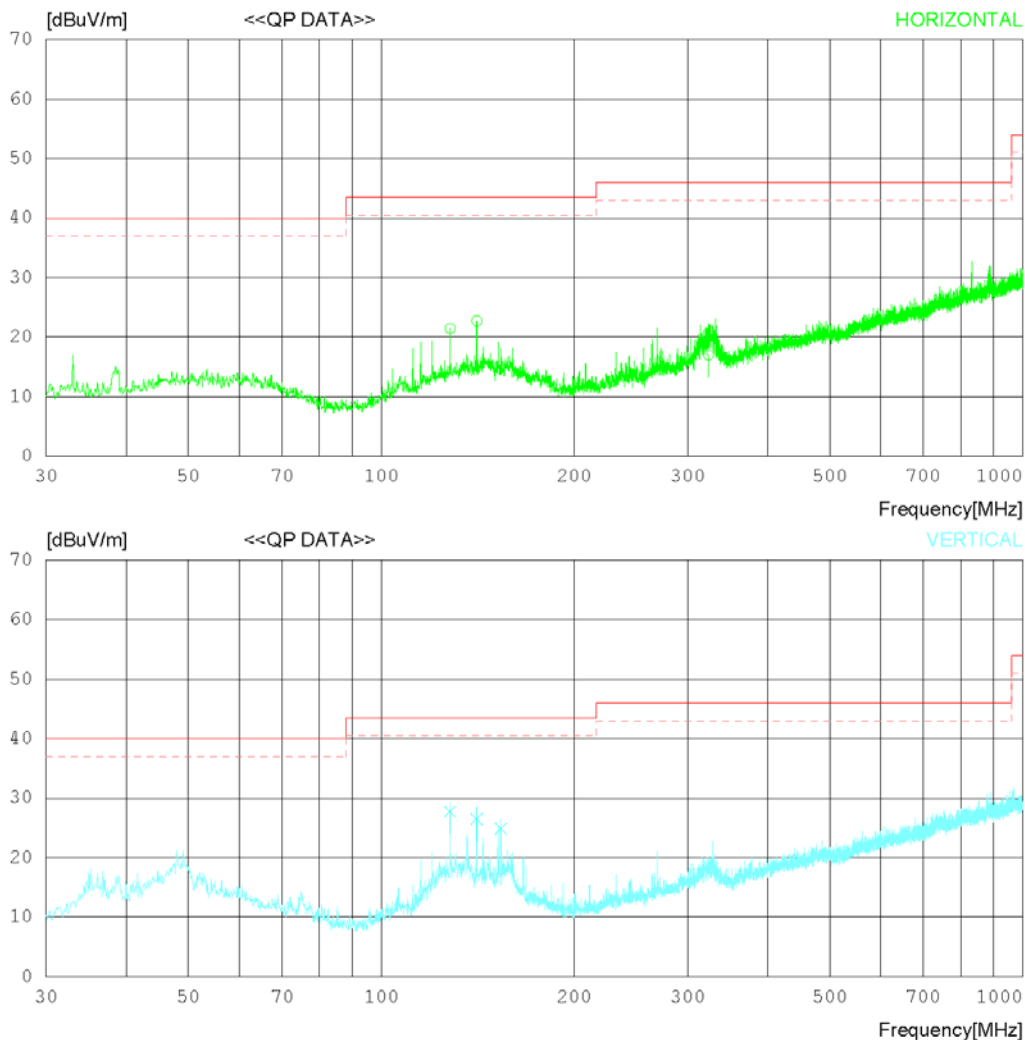
Date 2021-04-29

Order No. DTNC2104-02591
Power Supply 120 V 60 Hz
Temp/Humi 23 °C 40 % R.H.
Test Condition PC/IF

Memo

LIMIT : FCC Part15 Subpart.B Class B (3m)
MARGIN: 3 dB

Antenna Factor
1. EMC-228_VULB9160_9160-3339_with ATT_18403_2020.10.05
Cable Loss
1. #24_C1_ANT to BOTTOM_3m_창의_9K-1G_2021-02-19
2. #25_C2_Amp to BOTTOM_3m_창의_9K-1G_2021-02-19
3. #26_C3_Amp to Receiver_3m_창의_9K-1G_2021-02-19
Pre Amp Gain
1. EMC-110_AMP_MLA-100K01-B01-26_1252741_2021.02.08



RADIATED EMISSION

Date 2021-04-29

Order No. DTNC2104-02591
Power Supply 120 V 60 Hz
Temp/Humi 23 °C 40 % R.H.
Test Condition PC/IF

Memo

LIMIT : FCC Part15 Subpart B Class B (3m)
MARGIN: 3 dB

Antenna Factor

1. EMC-228_VULB9160_9160-3339_with ATT_18403_2020.10.05
Cable Loss

1. #24_C1_ANT to BOTTOM_3m_창의_9K-1G_2021-02-19

2. #25_C2_Amp to BOTTOM_3m_창의_9K-1G_2021-02-19

3. #26_C3_Amp to Receiver_3m_창의_9K-1G_2021-02-19

Pre Amp Gain

1. EMC-110_AMP_MLA-100K01-B01-26_1252741_2021.02.08

No.	FREQ [MHz]	READING QP [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- HORIZONTAL -----										
1	128.002	28.85	17.90	1.49	26.80	21.44	43.50	22.06	130	131
2	140.797	29.00	18.90	1.59	26.77	22.72	43.50	20.78	118	79
3	323.701	21.04	19.87	2.61	26.53	16.99	46.00	29.01	130	93
----- VERTICAL -----										
4	128.002	35.16	17.90	1.49	26.80	27.75	43.50	15.75	105	81
5	140.802	32.78	18.90	1.59	26.77	26.50	43.50	17.00	115	101
6	153.598	31.09	18.90	1.67	26.75	24.91	43.50	18.59	123	154

Radiated disturbance at (30 ~ 1000) MHz _Measurement data			
Test configuration mode	2	EUT Operation mode	2
Test voltage (V)	AC 120	Test Frequency (Hz)	60
RSS-215 Issue 2			

RADIATED EMISSION

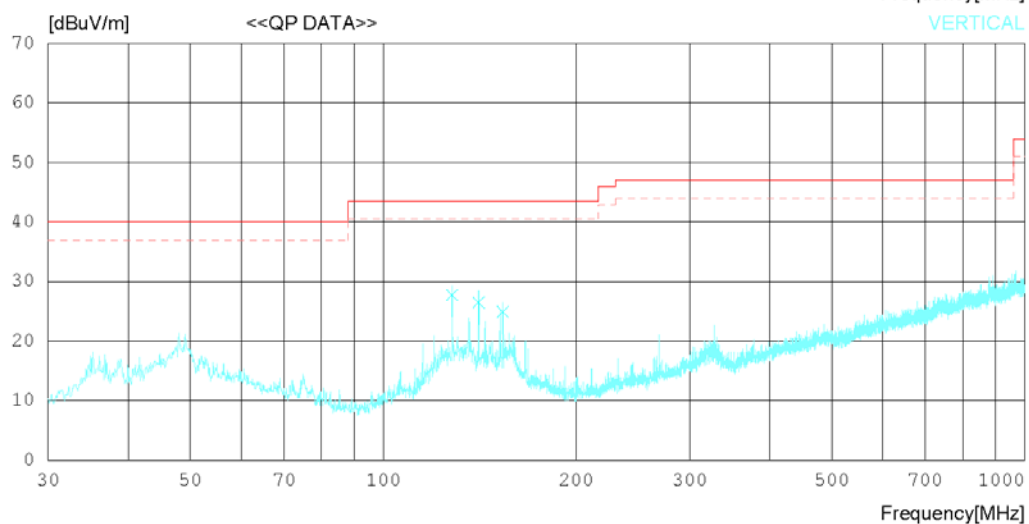
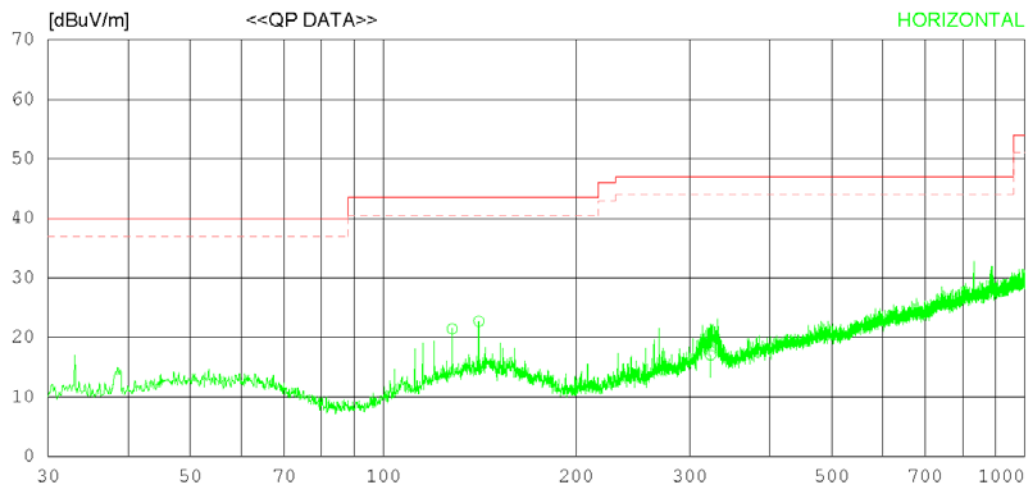
Date 2021-04-29

Order No. DTNC2104-02593
Power Supply 120 V 60 Hz
Temp/Humi 23 'C 40 % R.H.
Test Condition PC/IF

Memo

LIMIT : ICES-003 Issue 7 _Class B
MARGIN: 3 dB

Antenna Factor
1. EMC-228_VULB9160_9160-3339_with ATT_18403_2020.10.05
Cable Loss
1. #24_C1_ANT to BOTTOM_3m_창의_9K-1G_2021-02-19
2. #25_C2_Amp to BOTTOM_3m_창의_9K-1G_2021-02-19
3. #26_C3_Amp to Receiver_3m_창의_9K-1G_2021-02-19
Pre Amp Gain
1. EMC-110_AMP_MLA-100K01-B01-26_1252741_2021.02.08



RADIATED EMISSION

Date 2021-04-29

Order No. DTNC2104-02593
Power Supply 120 V 60 Hz
Temp/Humi 23 °C 40 % R.H.
Test Condition PC/IF

Memo

LIMIT : ICES-003 Issue 7_Class B
MARGIN: 3 dB

Antenna Factor
1. EMC-228_VULB9160_9160-3339_with ATT_18403_2020.10.05
Cable Loss
1. #24_C1_ANT to BOTTOM_3m_창의_9K-1G_2021-02-19
2. #25_C2_Amp to BOTTOM_3m_창의_9K-1G_2021-02-19
3. #26_C3_Amp to Receiver_3m_창의_9K-1G_2021-02-19
Pre Amp Gain
1. EMC-110_AMP_MLA-100K01-B01-26_1252741_2021.02.08

No.	FREQ [MHz]	READING QP [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- HORIZONTAL -----										
1	128.002	28.85	17.90	1.49	26.80	21.44	43.50	22.06	130	131
2	140.797	29.00	18.90	1.59	26.77	22.72	43.50	20.78	118	79
3	323.701	21.04	19.87	2.61	26.53	16.99	47.00	30.01	130	93
----- VERTICAL -----										
4	128.002	35.16	17.90	1.49	26.80	27.75	43.50	15.75	105	81
5	140.802	32.78	18.90	1.59	26.77	26.50	43.50	17.00	115	101
6	153.598	31.09	18.90	1.67	26.75	24.91	43.50	18.59	123	154

Radiated disturbance at (1 ~ 6) GHz _Peak Measurement data			
Test configuration mode	2	EUT Operation mode	2
Test voltage (V)	AC 120	Test Frequency (Hz)	60

RADIATED EMISSION

Date 2021-04-29

Order No. DTNC2104-02591
Power Supply 120 V 60 Hz
Temp/Humi 23 'C 40 % R.H.
Test Condition PC/IF

Memo

LIMIT : FCC Part15 Subpart.B Class B (3m) - GHz(Peak)
FCC Part15 Subpart.B Class B (3m) - GHz(Peak)

Antenna Factor

1. ANT_9120D_1828_20.10.21

Cable Loss

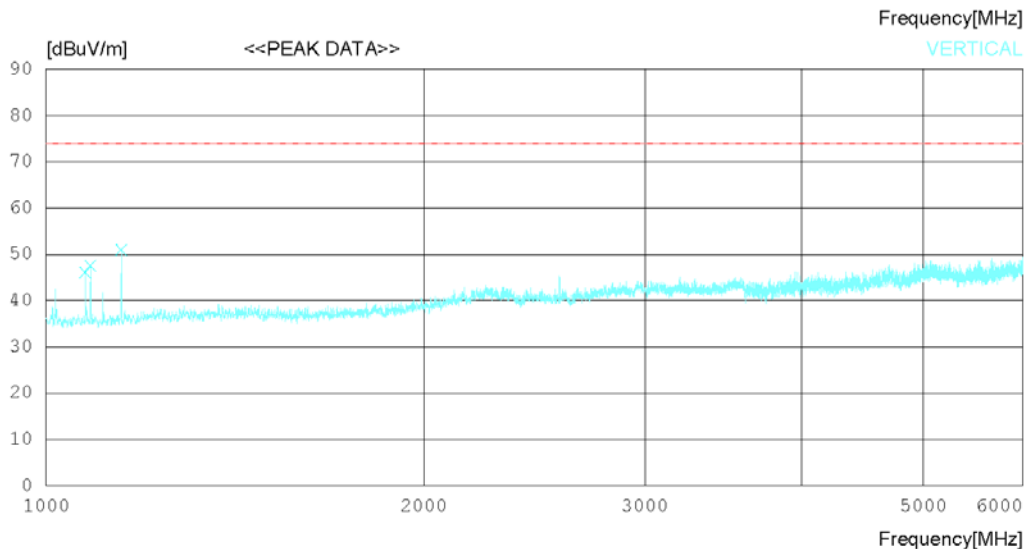
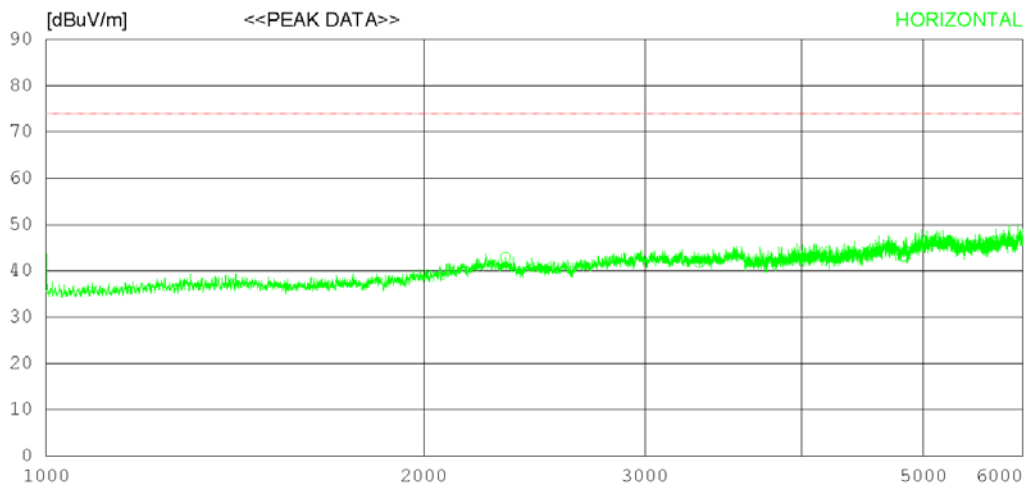
1. #27_C1_Ant to Bottom_3m_창의_1-18G_2021.02.25

2. #28_C2_Bottom to Amp(Filter,Receiver)_3m_창의_1-18G_2021.02.25

3. #29_C3_Amp to Receiver_3m_창의_1-18G_2021.02.25

Pre Amp Gain

1. AMP_8449B_3008A00887_2020.08.31



RADIATED EMISSION

Date 2021-04-29

Order No. DTNC2104-02591
Power Supply 120 V 60 Hz
Temp/Humi 23 °C 40 % R.H.
Test Condition PC/IF

Memo

LIMIT : FCC Part15 Subpart B Class B (3m) - GHz(Peak)
FCC Part15 Subpart B Class B (3m) - GHz(Peak)

Antenna Factor

1. ANT_9120D_1828_20.10.21

Cable Loss

1. #27_C1_Ant to Bottom_3m_창의_1-18G_2021.02.25

2. #28_C2_Bottom to Amp(Filter,Receiver)_3m_창의_1-18G_2021.02.25

3. #29_C3_Amp to Receiver_3m_창의_1-18G_2021.02.25

Pre Amp Gain

1. AMP_8449B_3008A00887_2020.08.31

No.	FREQ [MHz]	READING PEAK [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- HORIZONTAL -----										
1	2322.500	43.80	27.73	6.54	35.13	42.94	74.0	31.06	321	230
2	3315.625	40.90	28.27	7.73	35.04	41.86	74.0	32.14	128	130
3	4820.625	37.40	31.14	9.73	35.03	43.24	74.0	30.76	223	33
----- VERTICAL -----										
4	1075.000	53.30	24.80	4.08	36.12	46.06	74.0	27.94	375	158
5	1085.000	54.80	24.80	4.10	36.11	47.59	74.0	26.41	350	158
6	1148.125	58.00	24.80	4.25	36.04	51.01	74.0	22.99	100	158

Radiated disturbance at (1 ~ 6) GHz _ Average Measurement data			
Test configuration mode	2	EUT Operation mode	2
Test voltage (V)	AC 120	Test Frequency (Hz)	60

RADIATED EMISSION

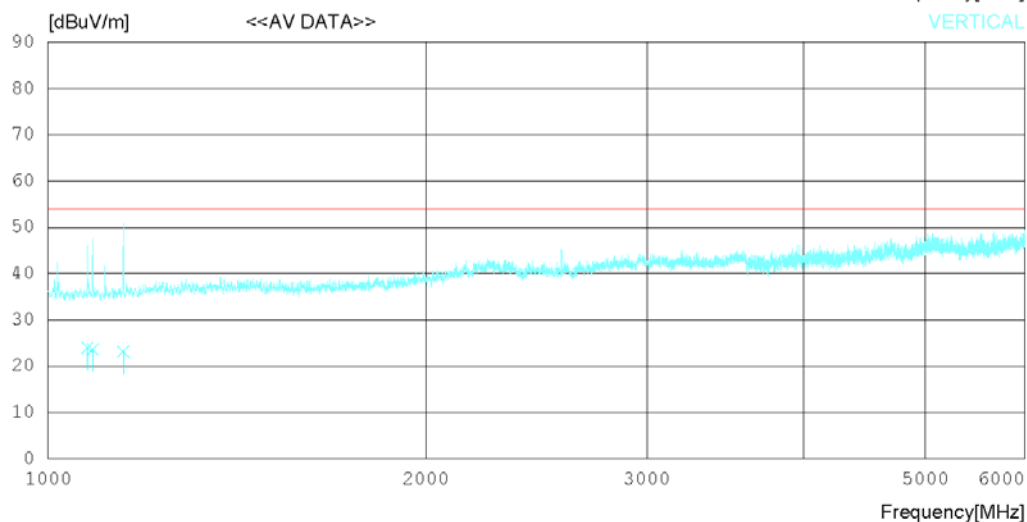
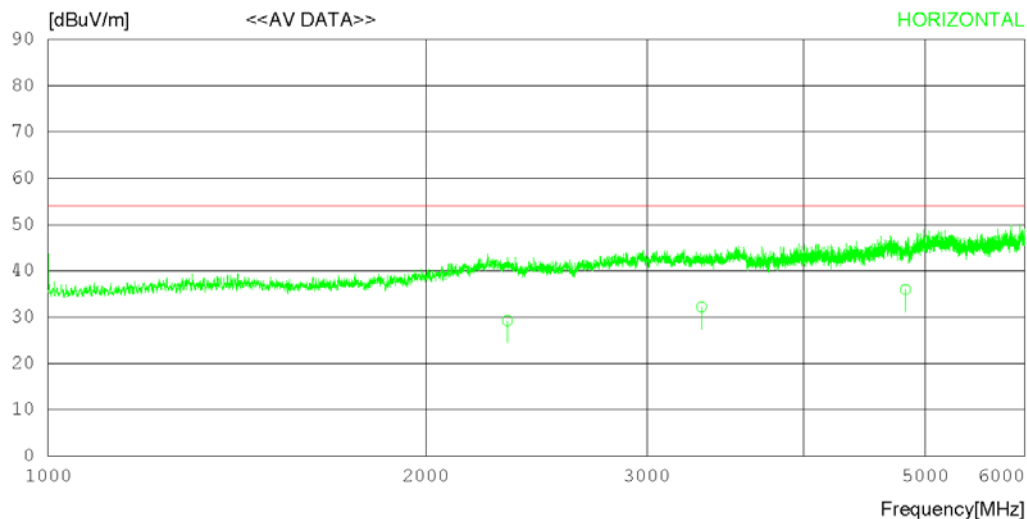
Date 2021-04-29

Order No. DTNC2104-02591
Power Supply 120 V 60 Hz
Temp/Humi 23 'C 40 % R.H.
Test Condition PC/IF

Memo

LIMIT : FCC Part15 Subpart.B Class B (3m) - GHz(Average)
FCC Part15 Subpart.B Class B (3m) - GHz(Average)

Antenna Factor
1. ANT_9120D_1828_20.10.21
Cable Loss
1. #27_C1_Ant to Bottom_3m_창의_1-18G_2021.02.25
2. #28_C2_Bottom to Amp(Filter,Receiver)_3m_창의_1-18G_2021.02.25
3. #29_C3_Amp to Receiver_3m_창의_1-18G_2021.02.25
Pre Amp Gain
1. AMP_8449B_3008A00887_2020.08.31



RADIATED EMISSION

Date 2021-04-29

Order No. DTNC2104-02591
Power Supply 120 V 60 Hz
Temp/Humi 23 °C 40 % R.H.
Test Condition PC/IF

Memo

LIMIT : FCC Part15 Subpart B Class B (3m) - GHz(Average)
FCC Part15 Subpart B Class B (3m) - GHz(Average)

Antenna Factor

1. ANT_9120D_1828_20.10.21

Cable Loss

1. #27_C1_Ant to Bottom_3m_창의_1-18G_2021.02.25

2. #28_C2_Bottom to Amp(Filter,Receiver)_3m_창의_1-18G_2021.02.25

3. #29_C3_Amp to Receiver_3m_창의_1-18G_2021.02.25

Pre Amp Gain

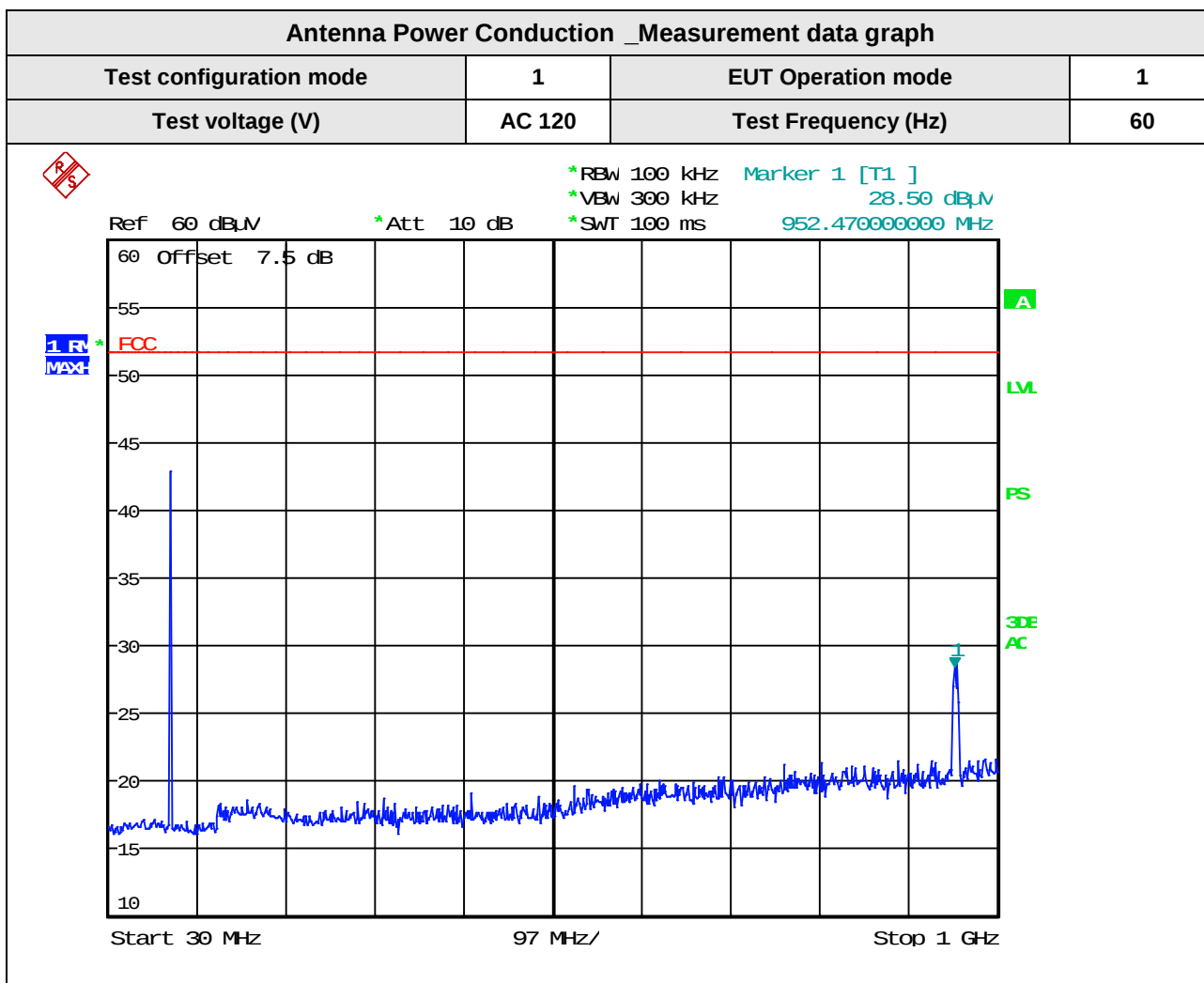
1. AMP_8449B_3008A00887_2020.08.31

No.	FREQ [MHz]	READING CAV [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- HORIZONTAL -----										
1	2322.241	30.12	27.73	6.54	35.13	29.26	54.00	24.74	230	248
2	3315.611	31.25	28.27	7.73	35.04	32.21	54.00	21.79	223	335
3	4820.247	30.17	31.14	9.73	35.03	36.01	54.00	17.99	113	33
----- VERTICAL -----										
4	1075.210	31.22	24.80	4.08	36.12	23.98	54.00	30.02	202	78
5	1085.067	30.82	24.80	4.10	36.11	23.61	54.00	30.39	223	102
6	1148.344	30.11	24.80	4.25	36.04	23.12	54.00	30.88	122	305

7.3 Antenna Power Conduction

ANSI C63.4	Antenna power conduction		Result
<u>Method:</u> Power on the receive antenna terminals was to be determined by measurement of the voltage present at these terminals. Antenna conducted power measurements was performed with the EUT antenna terminals connected directly to measuring instrument using a impedance-Matching network to connect the measurement Instrument to the antenna terminals of the EUT. The losses in decibels in impedance-matching network and cables was added to the measured values in dBμV. The measurements were repeated with the receiver tuned to a frequency until all of frequencies had been successively measured. Power in the receive antenna terminals in the ratio of V ² /R, where V is the loss-corrected voltage measured at the antenna terminals, and R is the impedance of the measuring instrument			Comply
Fully configured sample scanned over the following frequency range	Frequency range on each side of line	Limit	
	30 MHz to 300 MHz 300 MHz to 1 000 MHz	2 nW (51.7 dBμV)	
	54 MHz to 300 MHz 300 MHz to 450 MHz 450 MHz to 804 MHz	-26 dBmV (34 dBμV) -20 dBmV (40 dBμV) -15 dBmV (45 dBμV)	
Measurement Point	Tuner port		
EUT mode (Refer to clauses 4)	Test configuration mode	1	
	EUT Operation mode	1	

Measurement Instrument					
Description	Model	Manufacturer	Identifier	Cal. Date	Cal. Due
EMI TEST RECEIVER	ESC17	ROHDE&SCHWARZ	100910	2021-01-28	2022-01-28
SIGNAL GENERATOR	SMT03	ROHDE&SCHWARZ	100416	2020-06-03	2021-06-03
POWER SPLITTER	ZFRSC-123-S+	MINI CIRCUITS	SF139801142	2020-07-21	2021-07-21
MATCHING PAD	RAM	ROHDE&SCHWARZ	102138	2020-10-23	2021-10-23



8. Revision History

Date	Description	Revised By	Reviewed By
Jun. 11. 2021	Initial report	JunSeo Park	KyoungHwan Bae

-End of test report-